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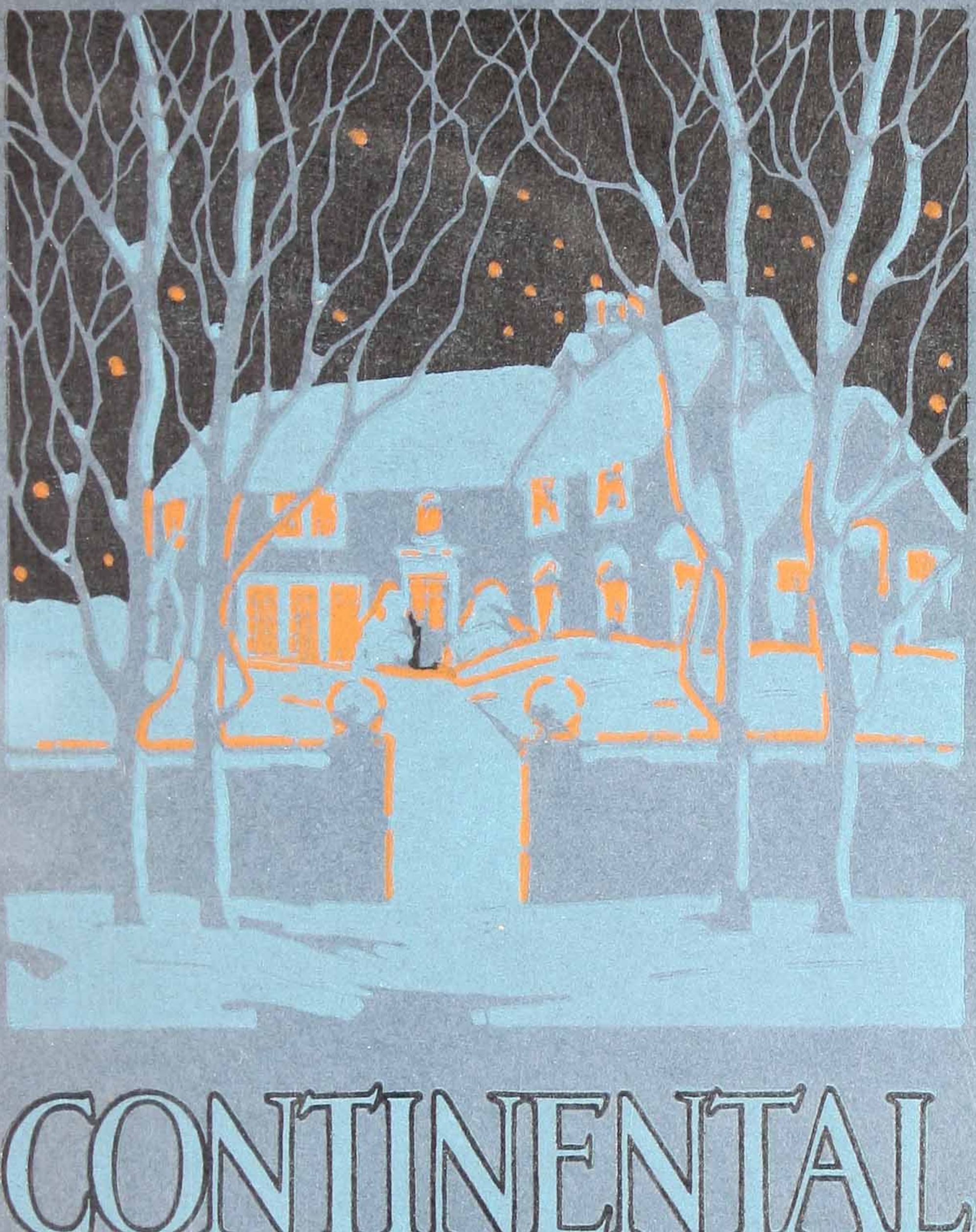
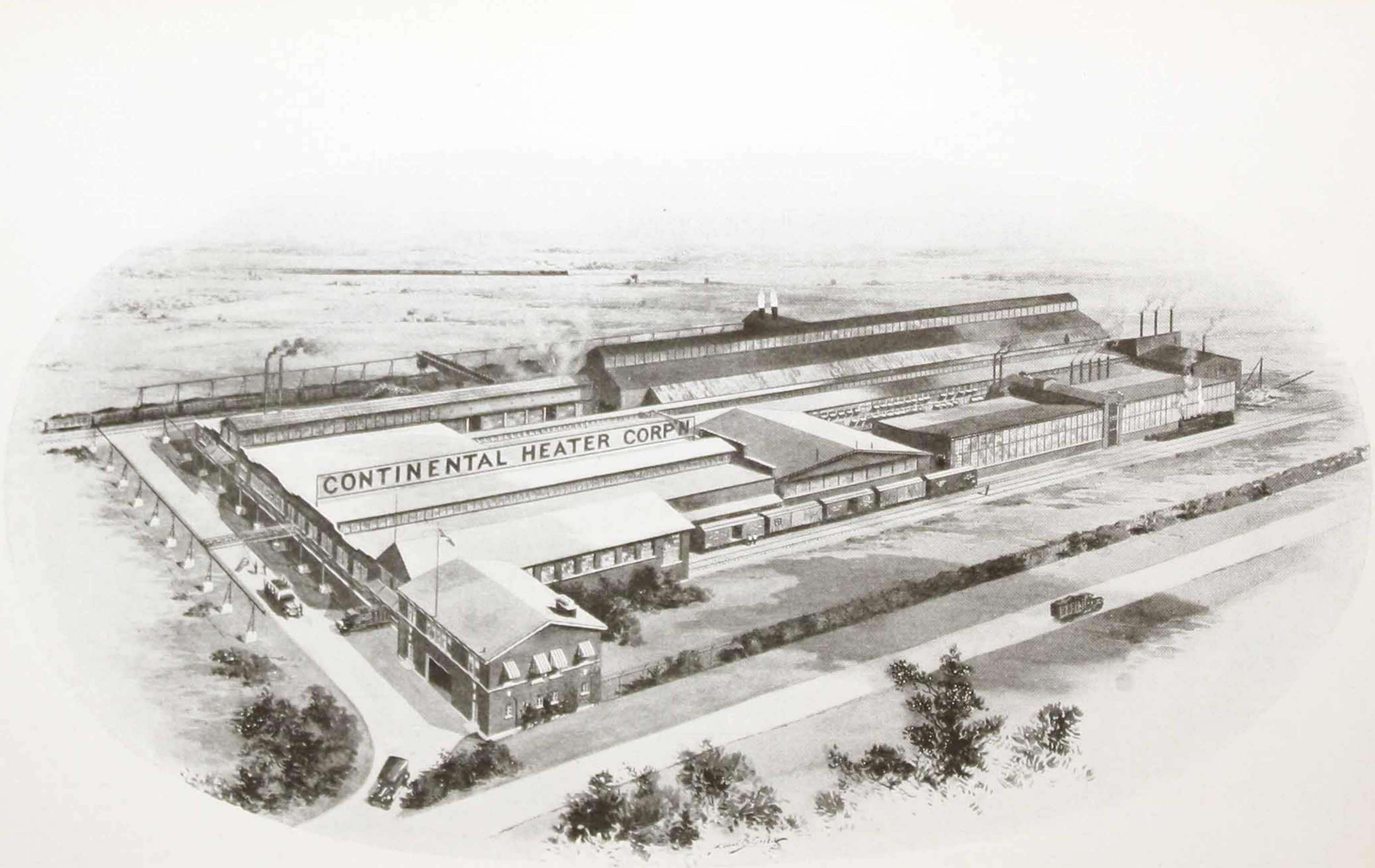


CONTINENTAL BOILERS AND RADIATORS

Continental

Boilers and Radiators



Plant and Offices of Continental Heater Corporation, Dunkirk, N. Y.

Continental

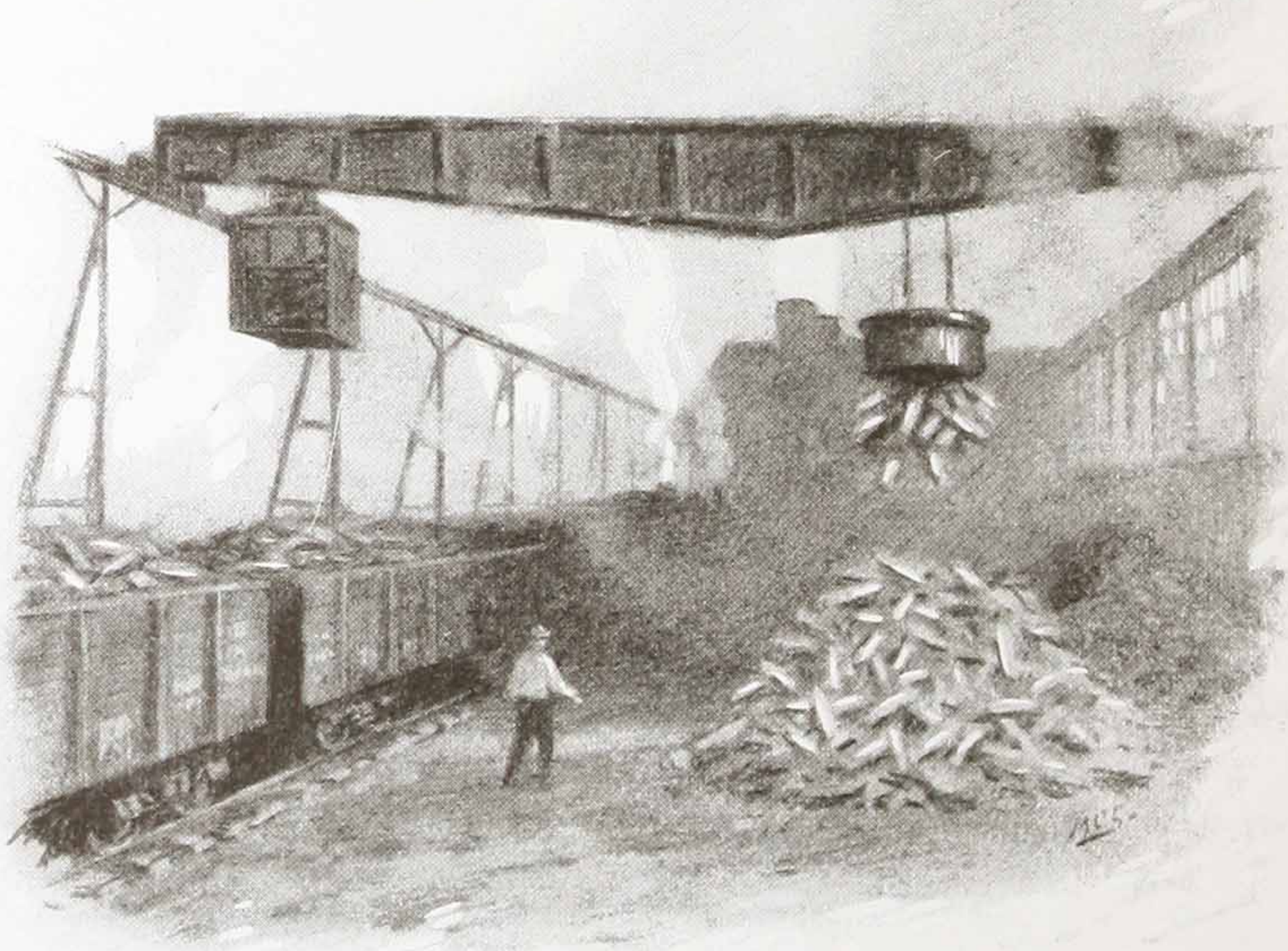
Boilers and Radiators

-built for better heating

Continental Heater Corporation

Dunkirk, N. Y., U.S.A.

IN A CITY where labor is at its best, where raw material assembles economically, and where four railroads contribute shipping facility, the forethought of its founders has placed the plants of the Continental Heater Corporation—planned to keep abreast of America's great industrial institutions.



By way of INTRODUCTION

Continental Boilers and Radiators are important parts of heating systems designed by foremost heating engineers to give to American homes, buildings, and public institutions, heating plants that from every engineering standpoint will deliver proper heat with minimum fuel expense. Every feature of their design, every detail of their construction, and all of the items that complete the sum of their serviceability contribute to that end.

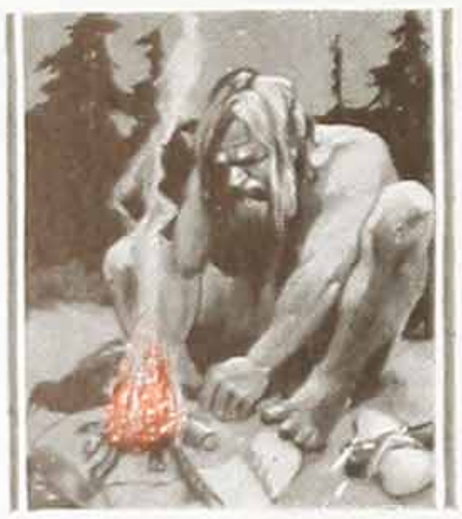
The plants of the Continental Heater Corporation were planned by men whose lifelong association with the boiler and radiator industry had given them a realization of the necessity for improved facilities for the manufacture of better-designed and better-made heating equipment.

That these products of Continental design are installed in the homes and buildings of thousands of American property owners is significant.

Heating engineers and contractors who have been brought into close association with this company, and property owners in whose buildings Continentals have been called to serve, have found a product reliable in performance and a personnel dependable in its promises.

You'll Enjoy Doing Business
With Continental

Better heating for better buildings



The open fire was primitive man's first source of light and heat. Torches and crude candles were gradually developed. After candles came oil lamps, then gas lights, and finally electric lighting. Gas was considered a big improvement over oil lamps, but not until electricity came into general use was it possible to easily and properly light all parts of a building. In much the same manner stoves replaced the cheery but ineffective fireplace. The hot air furnace was an improvement over stoves, but it remained for steam and hot water to place heating on the same high plane as electric lighting.

With America's Pageant of Progress has come not only great industrial buildings but new and varied types of home buildings. The romance of the cottage for two has been translated in hundreds of American cities to be a suite with kitchenette in an apartment hotel. For all of those different kinds of buildings, suitable heating plants were necessary and have been created.

This book with its illustrations and descriptions will give to the heating engineer and contractor the story of Continental achievements in the building of the heating equipment for many of America's most comfortable homes, public buildings, and institutions.

As a result of careful study of present-day heating problems, the engineering staff of the Continental Heating Corporation has produced and perfected heating equipment of a distinctly improved character.

Two such outstanding improvements distinguish Continental products:

The CONTINENTAL LOW WATER LINE BOILER—effecting savings of hundred of dollars in building construction to American property owners—

and the

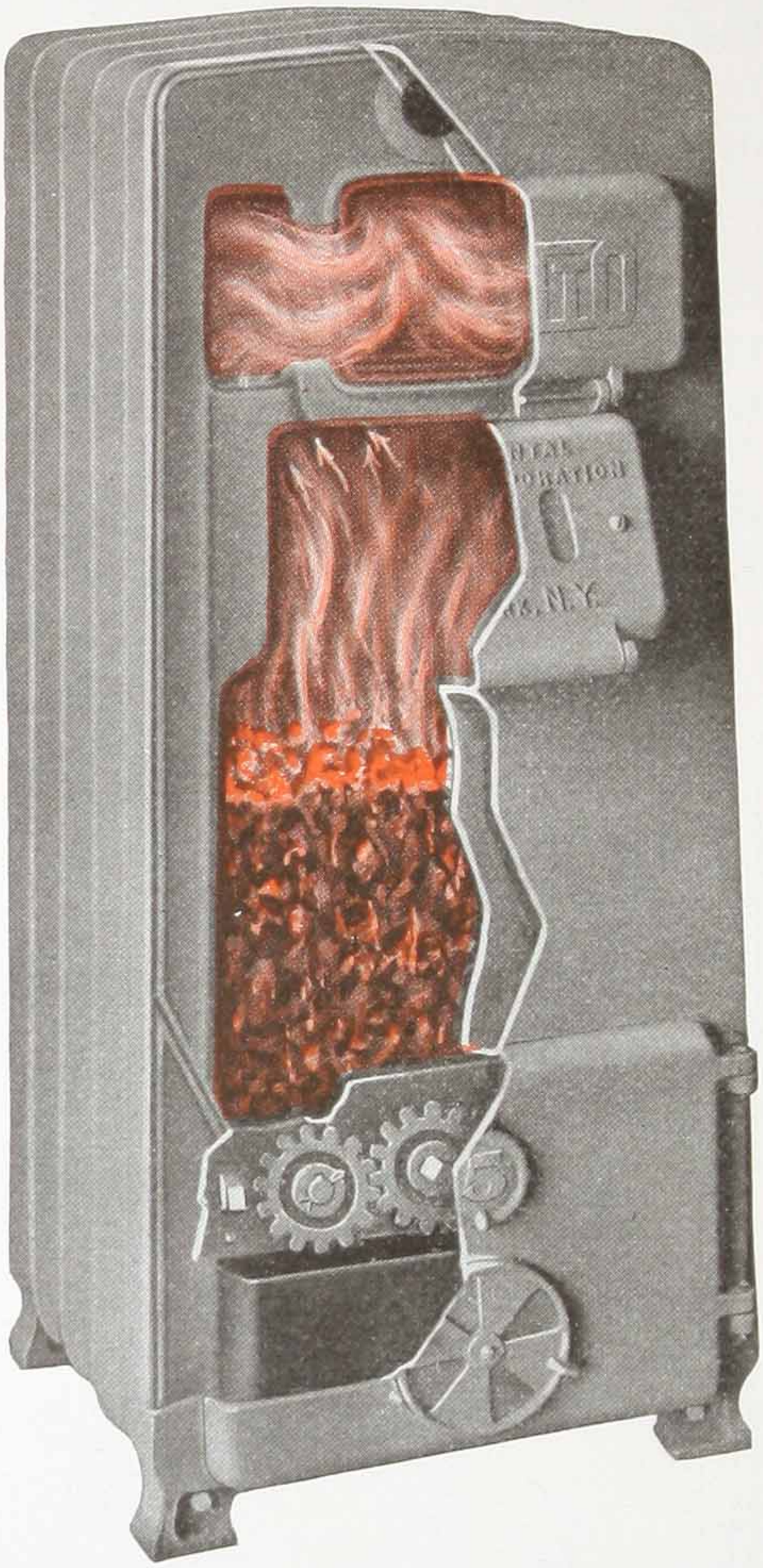
CONTENTO BOILER—making possible a modern heating system for the small home with or without a basement.

In the following pages of this book will be found descriptions in detail of these two distinctive types.

The guarantee covering Continental products is broad and genuine. The men who produce Continental Boilers and Radiators are the creators and the owners of the institution they serve.

Genuine interest and co-operation are a part of Continental responsibility. Continental Boilers and Radiators are—

"Built for Better Heating"



Interior view of Contento showing fire travel and roomy fire box

The Contento

The Contento is a development of our popular Continental Square Sectional Boiler. That it is a real boiler in every particular is proven by the universal success it has achieved.

The cut at the left illustrates the underlying reasons for Contento efficiency. The fire is drawn up and forward through the side flues and then back through the center flue. The hot gases are thus utilized instead of being wasted up the chimney.

The ample and roomy fire box carries a generous supply of fuel, making frequent attention unnecessary.

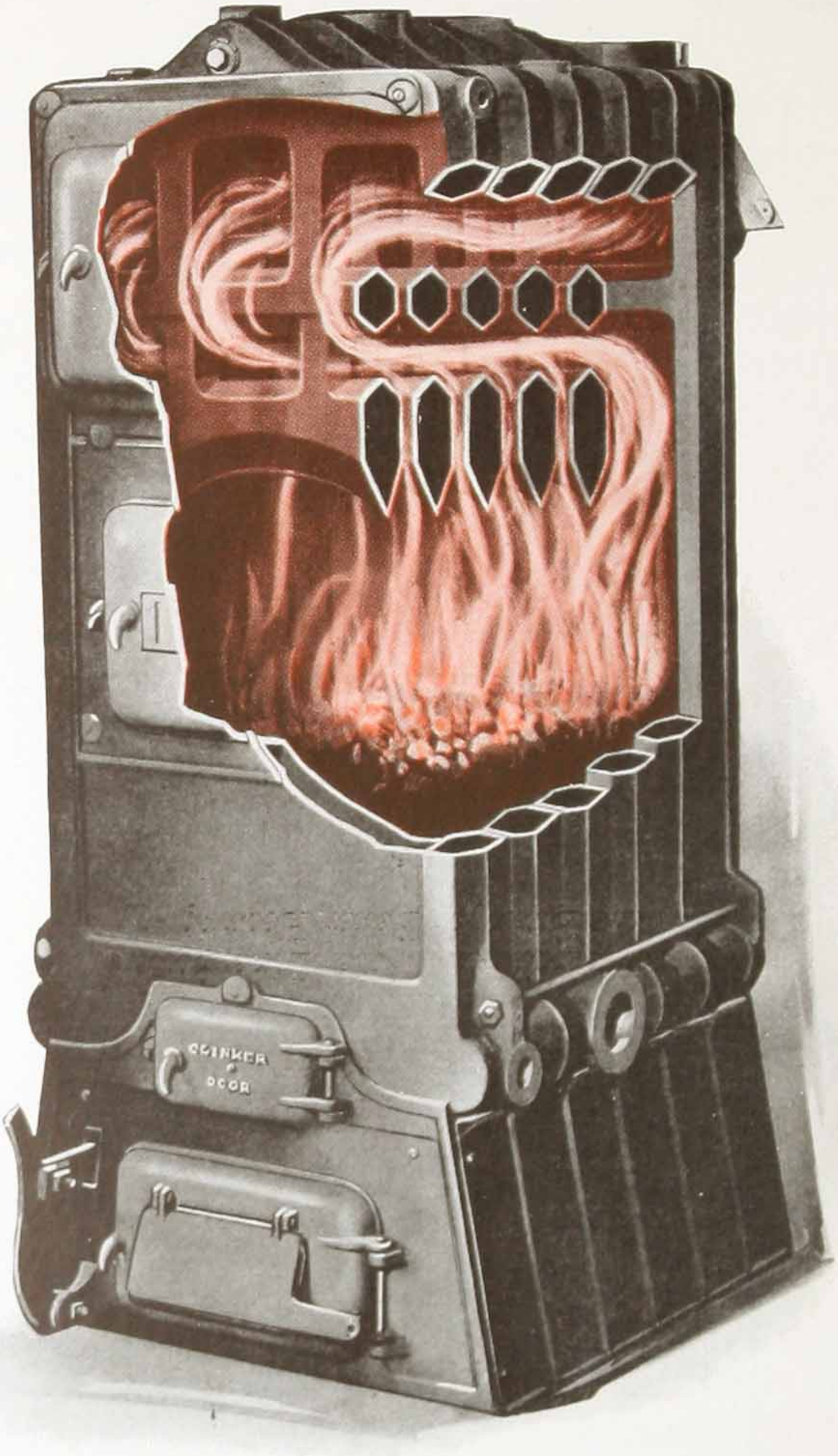
> "*You fire the* CONTENTO *and then put it out of your mind for hours; there is no need of either 'forcing' it or 'nursing' it to keep it going.*"

The Contento makes possible the installation of efficient hot water heating systems in homes and other buildings without basements, or where for some other reason the boiler must be placed on the same floor with the radiators.

It is equally efficient for basement installations, and since it is shipped completely assembled there is a considerable saving in installation cost. Being sectional and of push-nipple construction, the boiler may be easily increased in size any time the building is enlarged, by simply adding one or more sections.

The Contento is made in both steam and water type and, therefore, covers a wide field.

It is a compact, substantially-built heating unit, attractive in appearance, and thoroughly reliable.



Continental Square Sectional Boiler

Interior view showing double set of flueways and relative size of combustion chamber

Continental Square Sectional Boilers

When planning the home, too much thought cannot be given to the heating. The selection of a good boiler and a competent heating contractor will eliminate trouble and disappointment. It is usually almost impossible to correct a faulty heating plant and always very costly.

"*It is better to install a good heating plant, than to wish you had*".

Continental Square Sectional Boilers are designed to meet the two principal requirements of a residence boiler:

(1) To hold fire for long intervals without attention.

(2) To produce heat quickly when needed.

The roomy fire pot will hold a large charge of fuel, making frequent attention unnecessary. Its depth permits the burning of the fuel by slow and proper combustion.

The large amount of heating surface and the water tube construction make the boiler very responsive. It has a "quick pick up"—a feature greatly appreciated on cold mornings.

Note the design of the water columns which insure good circulation within the boiler, also the large flueways through which the fire travels forward and back again the full length of the boiler before passing up the chimney, thus utilizing every possible unit of heat.

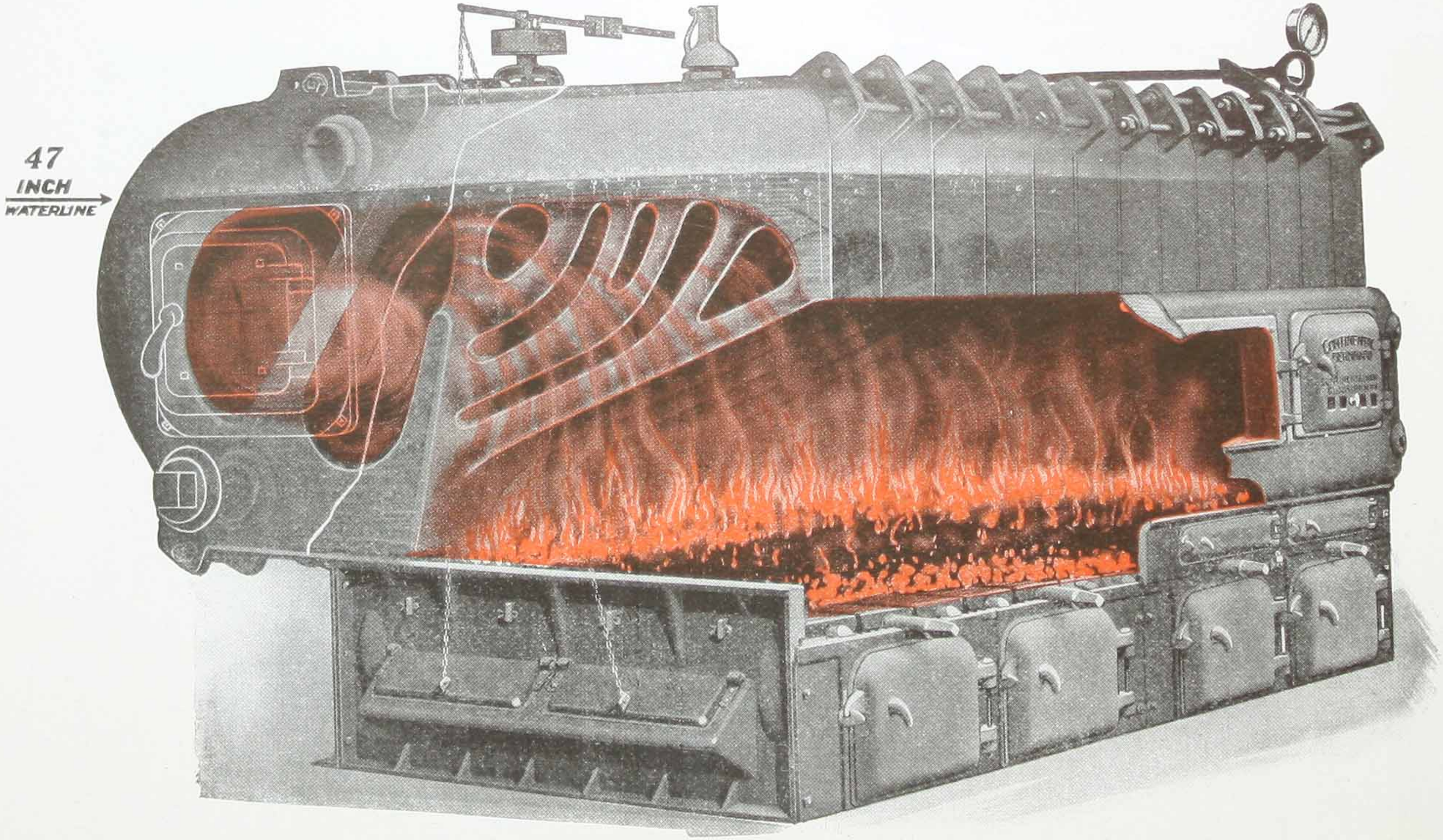
The flueways, owing to their size and positions, do not retard the draft. They are easily kept clean and the boiler can therefore be run at highest efficiency at all times.

A boiler with a short fire travel allows much of the heat to escape up the chimney. An improperly designed long fire travel retards the draft and if difficult to clean soon chokes up with soot.

The same correct ratio of grate surface to heating surface is maintained in all sizes of Continental Boilers. When the boiler is increased in size, both grate surface and heating surface are added.

The base is high and spreading, giving ample room for ashes. The grates are rocking and shaking. A slicer door is provided to assist in keeping the grates clean.

Continental Square Sectional Boilers are made for both water and steam. They are shipped assembled in two pieces; the assembled sections in one piece and the base crated. It requires only a few minutes to set the sectional part on the base and the boiler is then ready for piping.



Continental Low Water Line Boiler

Interior view illustrating reasons for its marvelous efficiency

Continental Low Water Line Boiler

The view at the left shows clearly the reasons for Continental Low Water Line Boiler efficiency.

It is the function of the boiler to produce steam, or heat water which is sent to the radiators to warm the building.

The efficiency of a boiler depends upon:

(1) The complete burning of all the fuel.

(2) The full utilization of all the heat thus created.

Continental Low Water Line Boilers are fired the short way of the grate, making possible the easy utilization of every inch of grate surface. Any portion of the grate which needs shaking or additional fuel can be attended to without disturbing the balance of the fire. This is made possible by the side-feed feature, the grate bars operating in sections of two or three.

In the ordinary end-feed type of boiler, it is necessary to shake the entire grate to get rid of ashes which may be preventing the fire from burning on a portion of the grate. As a result, live and unburned coals are shaken into the ash pit and wasted.

An even fire, which is recognized as the most efficient, can easily be maintained on the entire grate surface of Continental Low Water Line Boilers.

Continental Low Water Line Boilers meet the first requirement of an efficient boiler, because they are designed to burn all the fuel and can easily be fired in the most efficient manner.

The water-tube construction of Continental Low Water Line Boilers permits the placing of water-tubes in the fire box where they come in contact with the intense heat of the fire. The fire rises to the crown sheet, completely enveloping the tubes, then passes through ports to the first flueway, striking the rear wall which forms highly effective additional direct-fire surface the entire length of the boiler. The fire then passes to one end of the boiler, enters the rear flue and travels the full length of it before reaching the smoke outlet.

The last fire-travel is through the rear flue which is entirely surrounded by the cold water from the return pipes of the system. At this point there is the greatest difference between the temperature of the water and the hot gases and, therefore, the greatest amount of heat is absorbed by the water. In the ordinary boiler, the last fire-travel is through the top of the boiler which contains steam, or the hottest water which is so nearly the same temperature as the hot gases that very little additional heat can be absorbed. As a result, a high percentage of the heat is wasted up the chimney.

Continental Low Water Line Boilers meet the second requirement of an efficient boiler, because they utilize all the available heat, sending it to the radiators instead of allowing it to be wasted up the chimney.

Continental Boilers have proved their worth after many years of actual service in all parts of the country. They have stood the acid test of time and fire. A partial list of installations is shown on pages 24 to 31.

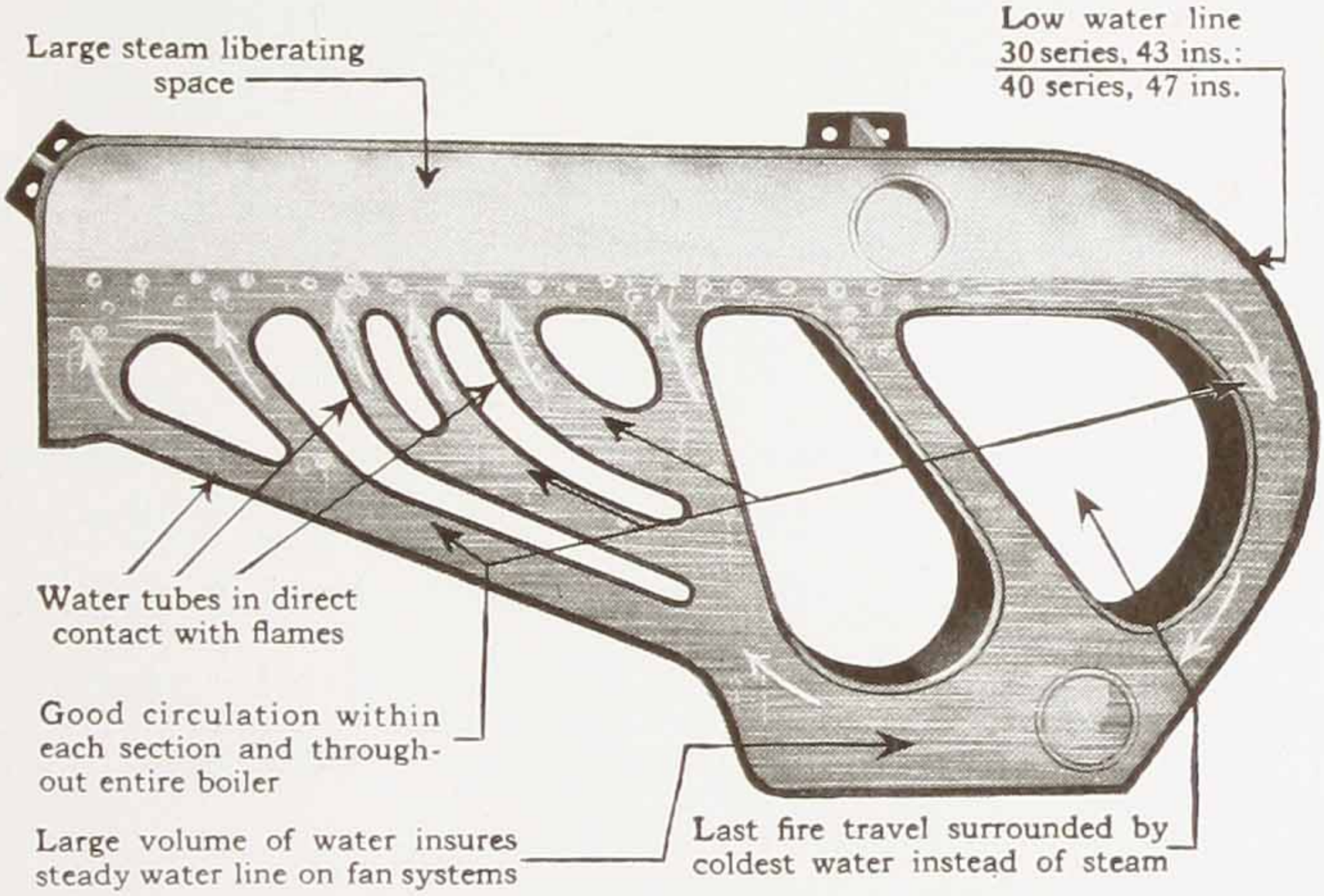
The Continental is Used Under All Conditions

The Continental Low Water Line Boiler fills ordinary as well as extraordinary heating requirements. It is used extensively where a low water line is not actually necessary because:—

It is a rapid steamer. It holds a steady water line.
It will burn any kind of fuel. It is easily fired.
It is thoroughly reliable.

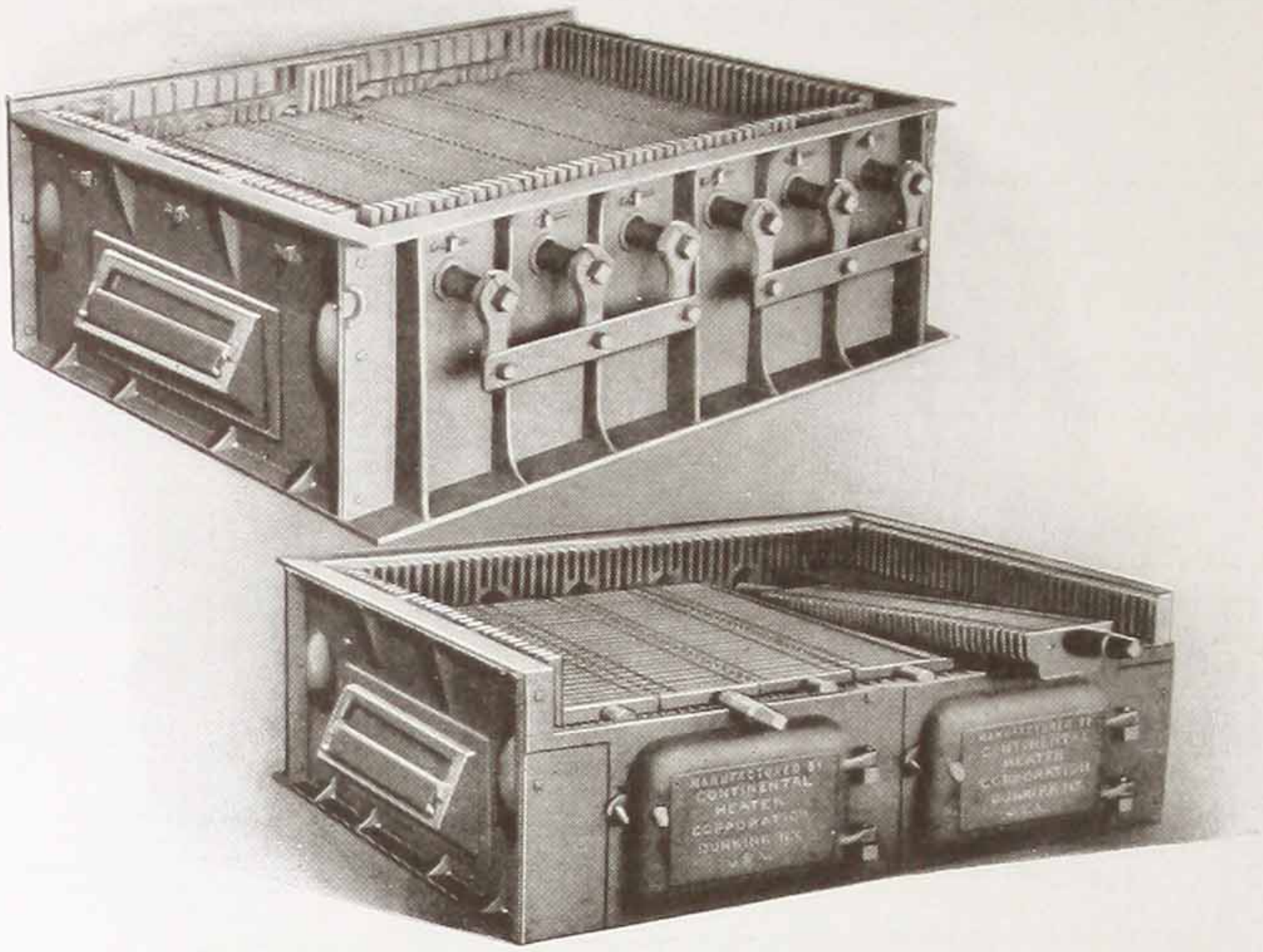
Boiler efficiency was not sacrificed to obtain a low water line. It is only one of several superior features resulting from special boiler designing, the sole object of which was:—

High boiler efficiency under actual working conditions.



The fire travel instead of being at the top of the boiler was placed to one side where the last fire travel is surrounded by the coldest water. Because of the greater difference in temperature, between the water and the hot gases, more heat is absorbed than in the ordinary type boiler where the last fire travel is surrounded by steam.

Continental Low Water Line Boilers
are Built for Better Heating



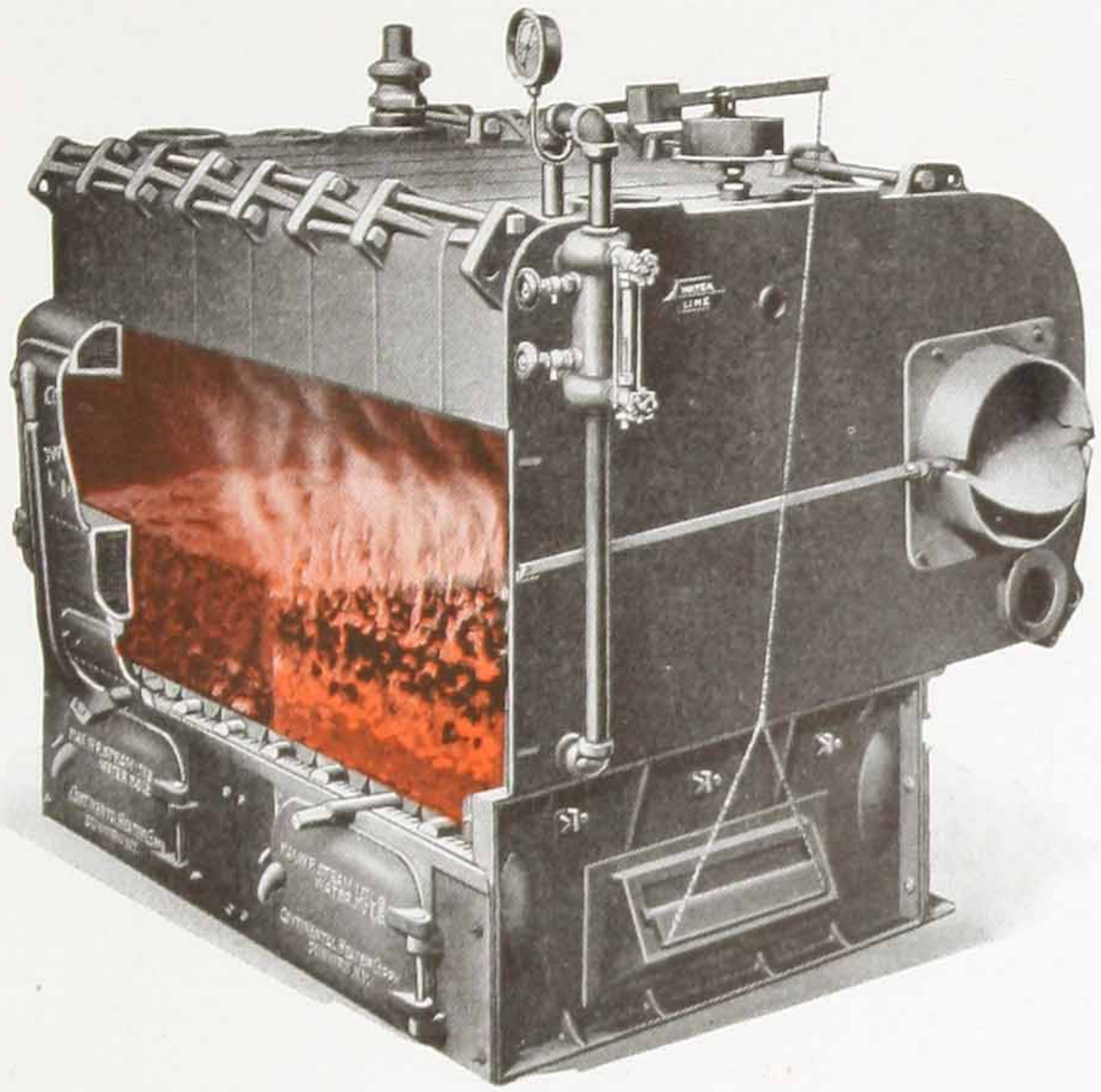
The grate bars extend through the rear of the base and the rocking attachment is outside of the base where it is easily and quickly accessible.

The grate bars can be removed and replaced by simply removing the slicer door frame and without the necessity of crawling into the fire box or ash pit.

The slicer door being at the end of the grate bars, the bars can be turned on an angle and the clinkers removed.

Any part of the grate can be shaken as desired, the grate bars being operated in sections of two or three. In mild weather only part of the grate surface need be used.

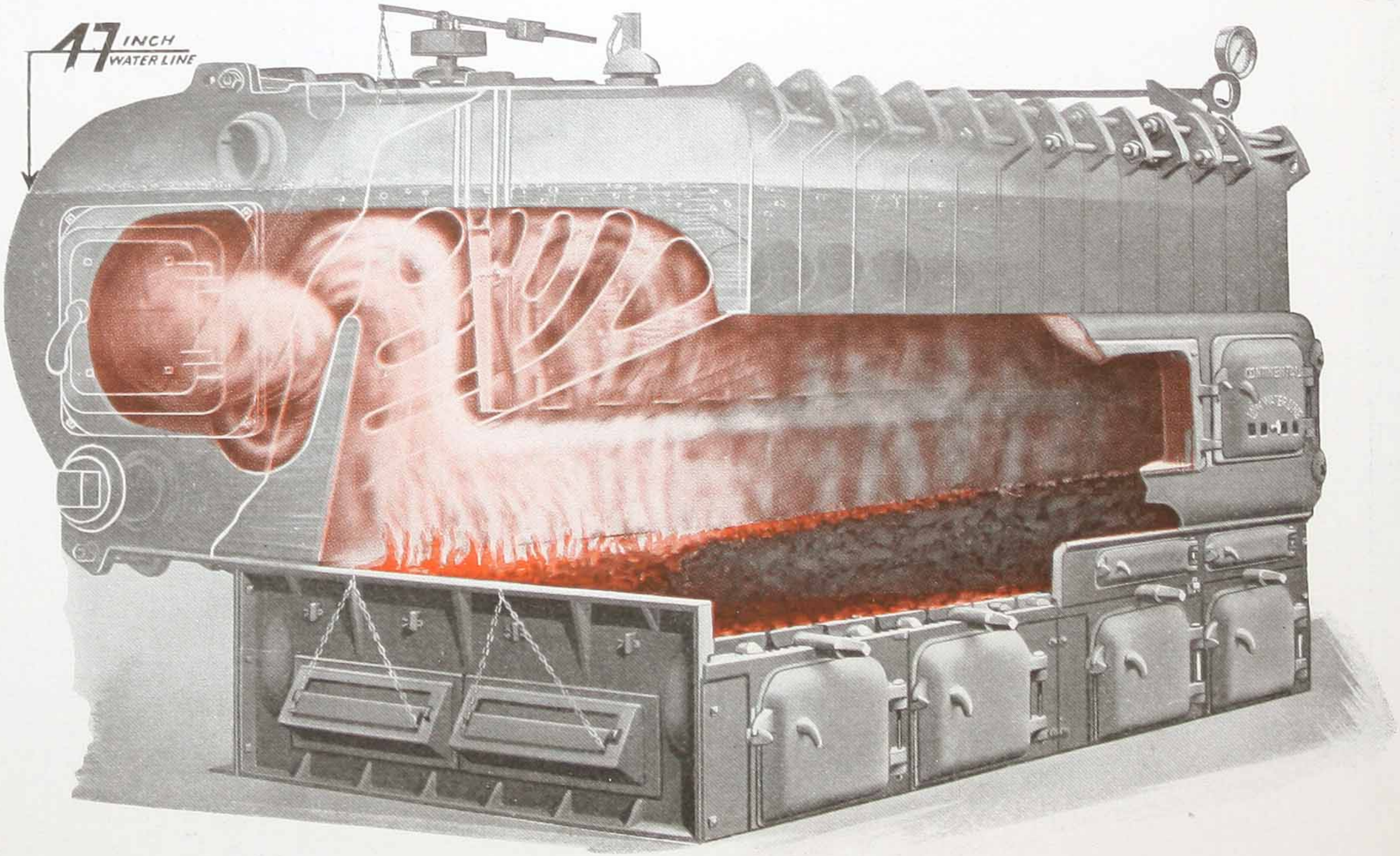
The draft doors are balanced and can easily be operated by the most sensitive damper regulator. This makes possible positive control of the fire.



Use Part of Fire Box in Mild Weather

A boiler should be large enough to supply proper heat in coldest winter weather. There are usually many mild days during the heating season and at such times the boiler is actually too large and fuel is wasted if the entire boiler is fired. If sufficient boiler capacity is not required to justify the use of a double series boiler, fuel can be saved by firing only part of the grate as illustrated above.

By packing ashes on one section of the grate, the area of the fire box is reduced and a small fire can easily be maintained. This is a special Continental feature made possible by the side feed and grate shaking arrangement.


47 INCH
WATER LINE

Smokeless Boilers

The single-grate smokeless boiler has proven its efficiency after several years' service and is now generally accepted as the logical type of smokeless boiler.

Before single-grate smokeless boilers were placed on the market by various manufacturers, soft coal was successfully burned in the Continental Low Water Line Boiler without objectionable smoke. This was because of the high degree of combustion which took place within the fire chamber, smoke being the result of imperfect combustion.

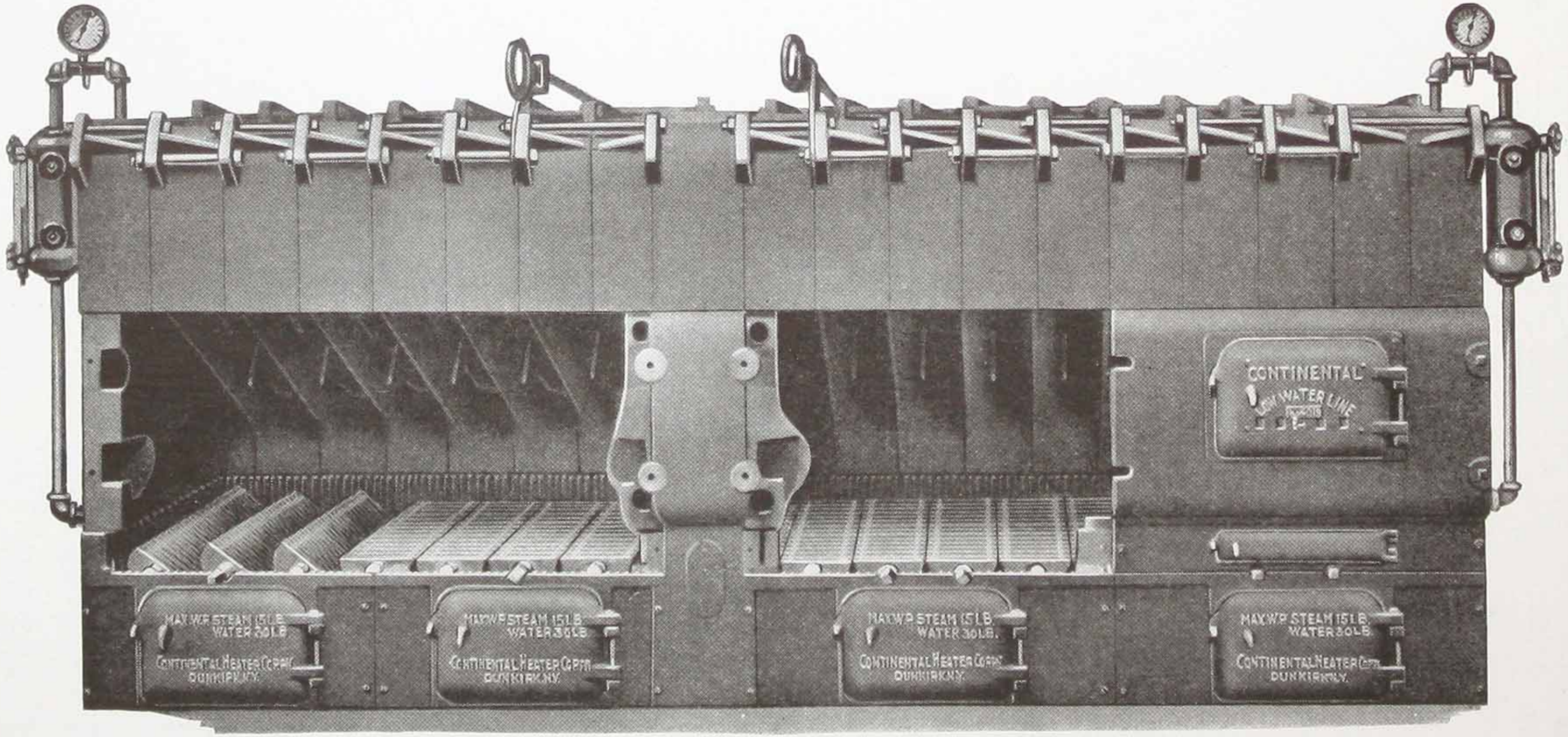
It was therefore a comparatively easy task to develop a smokeless boiler from our regular type. Specially-designed air retorts are placed between the intermediate sections, and supply heated air over the fire. They form a wall across the entire length of the fire box under which all fire must pass and be intimately mixed with the additional air necessary for good combustion.

Continental Smokeless Boilers have passed the smoke test in the principal cities throughout the country. An experienced fireman is not necessary to get good results from a Continental.

The same distinctive features which during the past ten years have made the regular type Continental Low Water Line Boiler so popular, are found in the Continental Smokeless Boiler.

The low water line eliminates the necessity for pits and high boiler room ceilings and makes it the ideal boiler for vapor installations.

The Continental is exceptionally easy to fire and very responsive. *Ask the man who fires one.*



Continental Low Water Line—Double-Series Boiler

Double-Series Boiler—Smokeless and Regular Type

The cut at the left shows the arrangement of the two fire boxes. It also illustrates how part of the grate can be shaken or dumped without disturbing the rest of the fire.

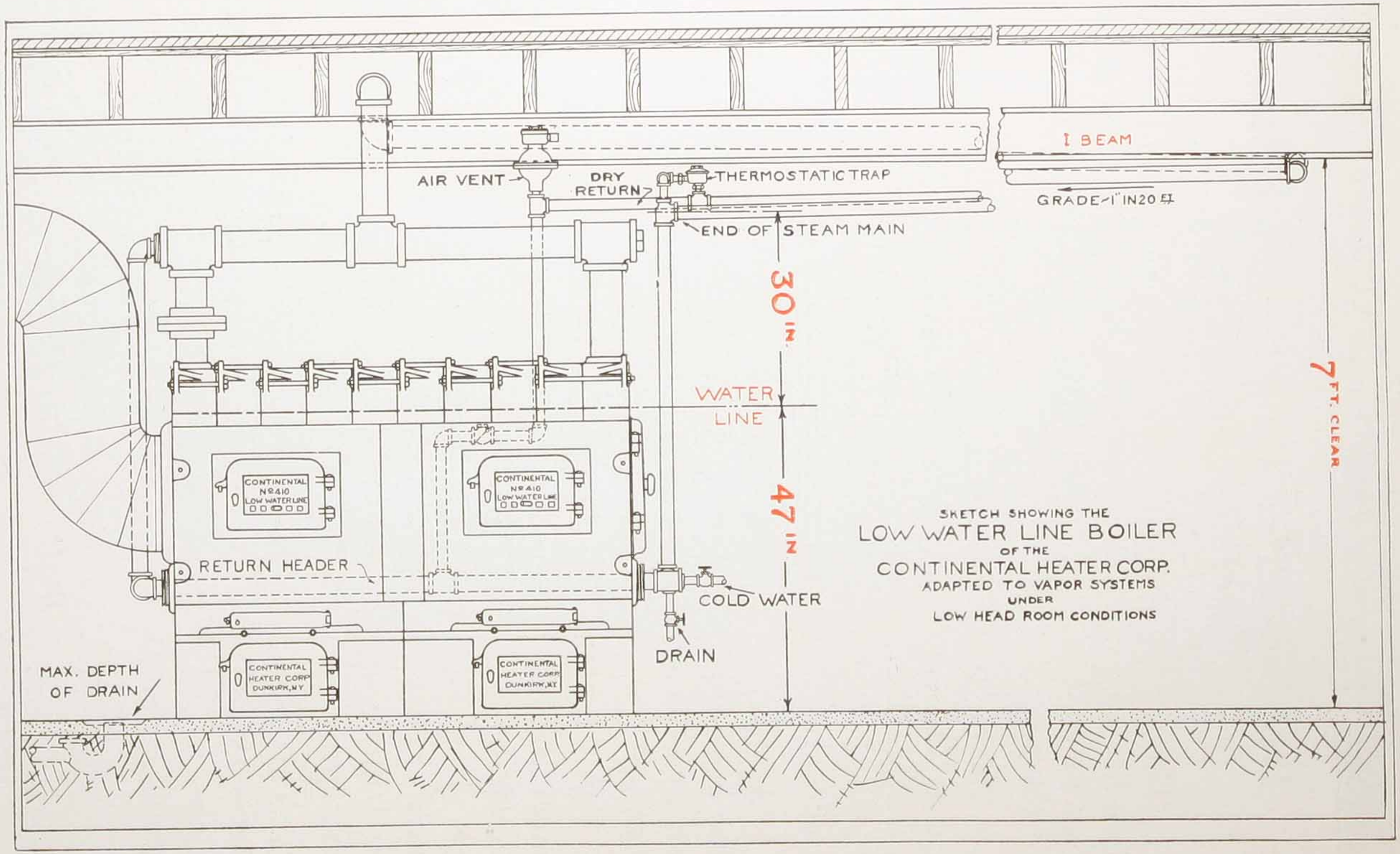
Winter temperatures in many parts of the country range from zero and below to fifty or sixty degrees. Zero weather is when heat is needed most and the boiler should therefore be large enough to warm the building comfortably in coldest winter weather.

A boiler large enough for zero weather is obviously too large for mild, average winter weather. To operate an oversize boiler throughout the year is like using a five-ton truck for a two-ton load.

The Continental Double Series Boiler is built to meet this condition. It consists of two separate fire boxes, either or both of which may be used. They may be of equal size or one larger than the other. The smaller one can be used in early fall and late spring and the larger one during average winter weather. In extremely cold weather both can be used.

This feature is a big coal saver because it is not necessary in mild weather to fire a boiler which is too large, nor in extreme weather force one that is too small.

Continental Boilers are
Built for Better Heating



SKETCH SHOWING THE
LOW WATER LINE BOILER
OF THE
CONTINENTAL HEATER CORP.
ADAPTED TO VAPOR SYSTEMS
UNDER
LOW HEAD ROOM CONDITIONS

Dollars Saved in Installation Cost by Continental Low Water Line Boilers

In the St. Louis Church, 28th and Master Streets, Philadelphia, a Continental Low Water Line Boiler cut the cost of the boiler installation in half by eliminating the necessity for a pit and underpinning of the stone walls of the boiler room. There are hundreds of similar cases.

One of the common causes of water line trouble is insufficient distance between the water line of the boiler and the dry return, to take care of the inequality in pressure in the system. To obtain the necessary distance, when the old type boiler is used, a pit is very often required. Pits are expensive and refuse-gathering.

Continental Low Water Line Boilers save hundreds of dollars in building construction by eliminating the necessity for pits and high boiler room ceilings. In addition they insure a good working heating system at a minimum cost of fuel and attention.

Instead of beautiful wall decorations, radiators would have hung on the walls of the Somerset Apartments, 1523 Jefferson Avenue, E., Detroit, if an ordinary type boiler had been installed as originally planned. The Continental Low Water Line Boiler saved the situation and the radiators were inconspicuously placed on the floor level.

The Somerset Apartment is 210 feet deep and the boiler room is in the extreme rear end. The steam main, not counting branches, is 490 feet long and feeds 7680 square feet of radiation. A 16,000-foot Double-Series Continental Smokeless Boiler, with a 47-inch water line, was installed. Half the boiler heats the entire building, using run of mine coal as fuel.

The drawing at the left shows a 5300-foot Continental boiler installed in a low basement in connection with a vapor installation.

Continental Low Water Line Boilers are highly favored for vapor work because of the low steady water line and their ability to rapidly produce volumes of dry steam.

Tried by Time and Fire

One of the most common questions asked about an automobile, is "How does it stand up?" That question can only be answered after the machine has stood the test of actual service. Years of service under all kinds of conditions answers that question regarding Continental Low Water Line Boilers. The following list of installations selected at random from thousands, shows that Continentals meet the varied boiler requirements of all parts of the country.

	Boiler Steam Capacity	
ARKANSAS		
Horatio	6,700′	Public School
COLORADO		
Denver	22,300′	De Tilden Health School
Denver	7,400′	D. M. Waldman Apts.
Littleton	6,700′	High School
Steam Boat Springs	7,200′	County Court House
Windsor	9,000′	High School
CONNECTICUT		
New Haven	6 Boilers	Six Public Schools
Westville	29,200′	Intermediate School
DELAWARE		
Wilmington	5,300′	New Jerusalem Church
DISTRICT OF COLUMBIA		
Washington	4,600′	Apollo Theatre
Washington	2,000′	Engine House No. 27
GEORGIA		
Augusta	6,700′	Herald Building
IDAHO		
Pocatello	1,600′	J. T. Young Res.
ILLINOIS		
Chestnut	8,100′	Community High School
Decatur	5,300′	Alhambra Theatre
Elkhart	6,700′	Public School

	Boiler Steam Capacity	
DOWNERS GROVE	6,000′	Masonic Temple
GALENA	2,000′	First Trust & Savings Bank
GIRARD	11,100′	Township High School
JOLIET	1,600′	Wm. Kuhn Res.
OLNEY	3,200′	Elks' Theatre
PEORIA	2,500′	Judson Starr Res.
INDIANA		
ANDERSON	9,500′	Park Place School
BRAZIL	16,000′	Citizens' Theatre
COAL CITY	6,700′	Public School
DANA	2,400′	Dan Andrews' Store
FORT WAYNE	3,900′	Art School & Museum
INDIANAPOLIS	5,300′	Shirely Bros. Bldg.
LA FAYETTE	6,000′	Farmers' & Traders' Bank
MADISON	5,300′	Opera House
MADISON	6,700′	Masonic Temple
PERU	7,400′	Liberty Theatre
MARKLEVILLE	16,000′	Consolidated School
SOUTH BEND	6,000′	Standard Oil Co. Office
IOWA		
COUNCIL BLUFFS	6,000′	Hughes Palmer Garage
CEDAR RAPIDS	2,400′	Olympic Theatre
WADENA	2,800′	Public School
KENTUCKY		
LOUISVILLE	5,300′	Baxter Amusement Co.
LUDLOW	13,200′	Public School
LOUISIANA		
NEW ORLEANS	2,800′	Napoleon Ave. Presb. Church
NEW ORLEANS	4,600′	Scottish Rite Cathedral
NEW ORLEANS	9,000′	House of Detention
MAINE		
BANGOR	3,900′	Mrs. T. Allen, Greenhouse
MARYLAND		
CUMBERLAND	8,300′	Cumberland Heights School
FREDERICK	5,300′	H. & F. Railway Shops
HAGERSTOWN	2,500′	M. & S. Wolf Bldg.

MASSACHUSETTS

	Boiler Steam Capacity	
BROCKTON	3,900′	Y. W. C. A. Bldg.
HAVERHILL	25,000′	Strand Bldg.
HAVERHILL	8,300′	Masonic Temple

MICHIGAN

ALPENA	3,200′	Peoples' State Bank
ANN ARBOR	4,600′	Fletcher Hall
BIG RAPIDS	5,300′	Big Rapids Armory
DEARBORN	3,200′	Evangelical Church
DETROIT	16,700′	Somerset Apts.
DETROIT	8,100′	Fairview Recreation Bldg.
DETROIT	11,100′	Calvert Court Apts.
DETROIT	10,400′	Seward & Byron Apt.
LANSING	10,400′	Public School
ONAWAY	1,100′	Snody Drug Co.

MINNESOTA

BRAHAM	9,500′	High School
MINNEAPOLIS	5,300′	Salvation Army Bldg.

MISSISSIPPI

BELZONI	8,800′	Court House
CANTON	6,700′	Public School
GULFPORT	3,200′	King's Daughters Hospital
JACKSON	3,200′	Central Presbyterian Church
SHAW	12,500′	Shaw School

MISSOURI

LEBANON	3,900′	Public School
MOLERBY	3,200′	Tuggle Groelef Co.
ST. JOSEPH	5 Boilers	Ernst Mueller Greenhouse

NEBRASKA

BIG SPRINGS	6,000′	High School
LINCOLN	1,600′	Floyd Rawlings Bldg.

NEW JERSEY

	Boiler Steam Capacity	
ATLANTIC CITY	4,600′	H. Hantman Apt.
CLIFTON	13,200′	Public School
LAUREL SPRINGS	1,200′	H. C. Thompson Res.

NEW MEXICO

ALBUQUERQUE	15,300′	First National Bank

NEW YORK

ALBANY	1,200′	M. J. Canady Res.
AMSTERDAM	2,000′	J. B. Auto Company
BINGHAMTON	5,300′	Hotel Lincoln
BROOKLYN	8,100′	Apt. 82nd Bay Parkway
BROOKLYN	8,100′	Housing Station 19th St. near 55th
BROOKLYN	4,600′	Housing Station Atlantic Ave. near Utica
BROOKLYN	6,000′	U. S. P. O. Garage
BUFFALO	8,300′	Mitchell Parker Bldg.
BUFFALO	2,000′	S. K. Boughton, 1200 Seneca St.
BUFFALO	11,300′	Buffalo Chemical Fire Extinguisher
BUFFALO	4,600′	Le Barto Garage
DUNKIRK	6,000′	School No. 3
DUNKIRK	900′	W. W. Heppell Res.
DUNKIRK	1,200′	Dr. E. Bieber Res.
FREDONIA	27,600′	Junior High School
HUDSON FALLS	3,200′	S. C. Hagan Greenhouse
JAMESTOWN	6,000′	Third & Laf Garage
JAMESTOWN	14,600′	Palace Theatre
MATTEAWAN	7,400′	Marianist College
NEW YORK	2,400′	Convent of the Mothers of the Helpless
NEW YORK	5,300′	Housing Station, Rivingston & Tompkins
NEW YORK	3,200′	Jewel Theatre, 13 W. 116th St.
ONEONTA	4,600′	Smalley-Maxey Theatre

	Boiler Steam Capacity	
SINCLAIRVILLE	17,400′	High School
SCHENECTADY	4,600′	Pleasant Valley Comfort Sta.
SYRACUSE	2,000′	W. G. Tracy Res.
STATEN ISLAND	13,200′	Bethlehem Orphans' Asylum
WESTFIELD	1,100′	S. F. Nixon Res.

NORTH CAROLINA

NEW BERN	4,000′	Terminal Hotel

OHIO

APPLE CREEK	10,400′	District School
ASHTABULA	1,600′	Dr. W. H. Brown Res.
ASHTABULA	700′	Chas. N. Parnell Res.
ASHTABULA	10,400′	S. A. Luce Greenhouse
ASHTABULA	7,400′	Nicholas Ray Greenhouse
BELLEFONTAINE	2,400′	Oak Hotel
BOTKINS	8,800′	Immaculate Conception School
BUCYRUS	8,100′	Highway Hotel
CINCINNATI	8,300′	De Luxe Apt.
CLEVELAND	10,400′	German Club
CLEVELAND	5,300′	H. R. Crowe & Co. Bldg.
CLEVELAND	6,000′	Miller Apartment
COLDWATER	7,600′	Public School
COLUMBUS	1,200′	Carmel Bldg.
COLUMBUS	1,200′	Columbus Tile & Fire Place Co.
CONNEAUT	3,600′	Pond Lumber Co.
DAYTON	3,200′	Harry P. Clegg Res.
DAYTON	2,000′	Geo. Wentzel Garage
LIMA	1,200′	Elmer Barth Bldg.
SANDUSKY	2,800′	Center Store & Hotel
SHILOH	10,400′	Public School
SPRINGFIELD	1,600′	Ballinger Bldg.
TIPPECANOE CITY	11,800′	Township Bldg.
TOLEDO	3,200′	Manton Apts.
TOLEDO	6,700′	Bondy Motor Sales Bldg.

	Boiler Steam Capacity	
VALLEY CITY	10,400′	Public School
XENIA	2,800′	McClellan Hospital
YELLOW SPRINGS	1,600′	Catholic Church
OKLAHOMA		
MIAMI	3,900′	Carden Bldg.
PENNSYLVANIA		
ALTOONA	4,600′	Kress Company
AMBRIDGE	900′	St. Veronica Church
CHAMBERSBURG	900′	Shiffler Bldg.
COLLEGEVILLE	4,600′	Trinity Reformed Church
CRAFTON	4,600′	D. Cassley Garage
DALLASTOWN	900′	Schenberger Store & Res.
DUQUESNE	4,600′	Public School
EAST CARNEGIE	3,900′	Columbia Steel Shafting Co.
EAST LIBERTY	1,600′	Stuparitz Store Bldg.
ERIE	6,700′	Simon Garage
ERIE	5,800′	St. Peter's Cathedral
FARRELL	4,600′	People's Bank
FRANKLIN	3,200′	City Library
FRANKLIN	2,400′	Nurses' Home
HAZELWOOD	22,400′	St. Stephen Convent
KNOX	16,000′	White Memorial School
KUTZTOWN	3,200′	Farmers Bank & Trust Co.
MANOR	2,800′	First Methodist Church
MAYFIELD	2,800′	Grade School
McKEESPORT	6,900′	First Presbyterian Church
McKEESPORT	13,200′	Public School
MEADVILLE	3,900′	German Orphans' Home
MEDIA	1,600′	Media Confectionery
MIDLAND	1,600′	Carnegie Library
MT. LEBANON	5,300′	U. P. Church
MT. PLEASANT	5,300′	St. Joseph's School
NEW PARK	2,400′	Center Church
NORRISTOWN	4,200′	Wm. Yeager Bldg.
NORTH EAST	7,400′	Methodist Church

	Boiler Steam Capacity	
GWYNEDD VALLEY	2,000′	Mr. R. B. Strassburger Res.
PENNSBURG	3,200′	Lutheran Church
PHILADELPHIA	6,000′	Norris Square M. E. Church
PHILADELPHIA	3,900′	Cohen Apt. 47th, nth. of Spruce
PHILADELPHIA	5,300′	St. Louis' Church, Master St.
PHILADELPHIA	11,800′	Germantown Presb. Church
PHILADELPHIA	5,300′	Epiphany Church, 58th & Baltimore
PHILIPSBURG	7,400′	Lewis Finberg Bldg.
PITTSBURGH	19,000′	Hamnet Bldg.
POTTSVILLE	1,300′	W. B. Shugar's Res.
POTTSTOWN	3,900′	Paige-Jewett Garage
POTTSTOWN	2,000′	Norris City Garage
READING	2,400′	Elmhurst Apt.
READING	2,400′	Weber & Seiler Garage
ROCHESTER	14,600′	Pinney St. School
SCRANTON	900′	W. C. Davis Store & Apts.
SCHWENKSVILLE	3,600′	Bromer Tallis Co. Garage
SHARON	3,900′	United Presbyterian Church
SHARON	2,000′	Alpha Chi Rho Fraternity
WARREN	2,800′	Grace M. E. Church
WILKES-BARRE	11,100′	Spring Brook Water Supply Co.
WILKES-BARRE	3,000′	South Main Apt. Bldg.
WHITE HAVEN	2,400′	Sunny Rest Sanatorium
YORK	1,200′	Brooklyn Hotel

SOUTH DAKOTA

DALLAS	2,400′	School District No. 69
RAPID CITY	900′	Geo. Lampert Res.

TENNESSEE

CHATTANOOGA	3,200′	
JOHNSON CITY	6,200′	First National Bank
JOHNSON CITY	5,000′	Unka City Bank
JOHNSON CITY	6,200′	De Luxe Theater

TEXAS

	Boiler Steam Capacity	
ABILENE	7,400′	First Baptist Church
ATHENS	8,200′	High School
BEAUMONT	6,000′	Beaumont Floral Co.
DECATUR	6,700′	High School
HOUSTON	3,600′	Culliman Apt.
MEXIA	3,900′	Grammar School

VIRGINIA

NORFOLK	10,900′	Johnston Bldg.
NORFOLK	2,400′	Coplon Dollar Store
NORFOLK	6,900′	Barclay Apts.
VIRGINIA BEACH	900′	U. S. Coast Guard Station
ROANOKE	6,000′	C. & P. Telephone Bldg.
WINCHESTER	6,000′	Green House

WEST VIRGINIA

BARNABAS	10,400′	Main Island Creek Coal Co.
CHARLESTON	11,100′	First Presbyterian Church
GLENVILLE	3,900′	Normal School
WHEELING	4,400′	Hotel Wheeling

WISCONSIN

BANGOR	3,200′	Hasser Canning & Pickle Co.
GREEN BAY	3,200′	Platten Bldg.
GREEN BAY	4,000′	Van Lente Garage
KENOSHA	6,000′	Kenosha News Publishing Co.
SHEBOYGAN	3,900′	Columbia Shoe Co.

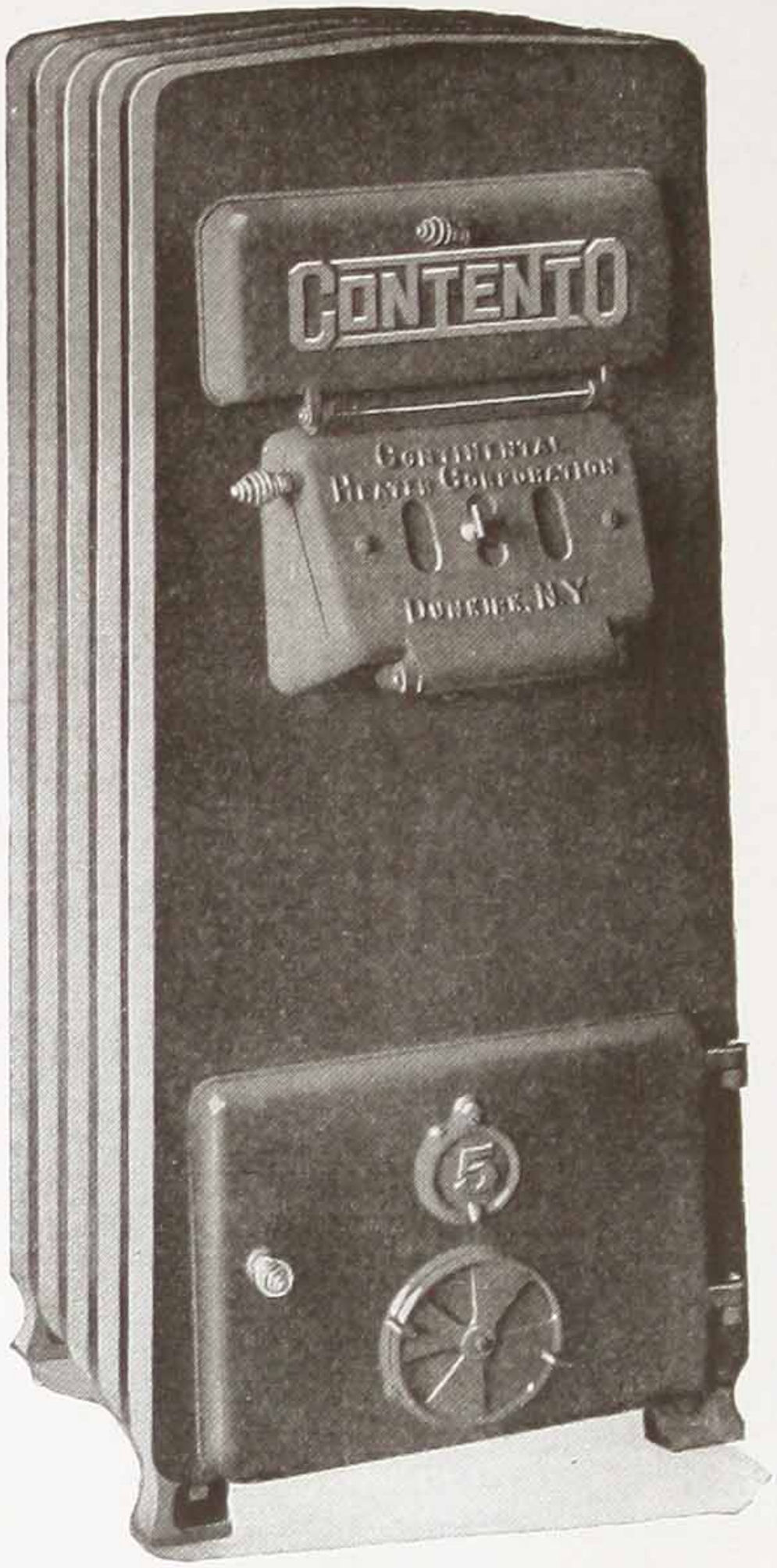
WYOMING

CHEYENNE	6,700′	Grade School
CASPAR	11,100′	Elks' Club
GREEN RIVER	3,600′	Sweetwater Auto Co.
ROCKY SPRINGS	8,100′	Grade School

JAPAN

YOKOHOMA	1,600′	Y. M. C. A.
KOBE	1,600′	Y. M. C. A.

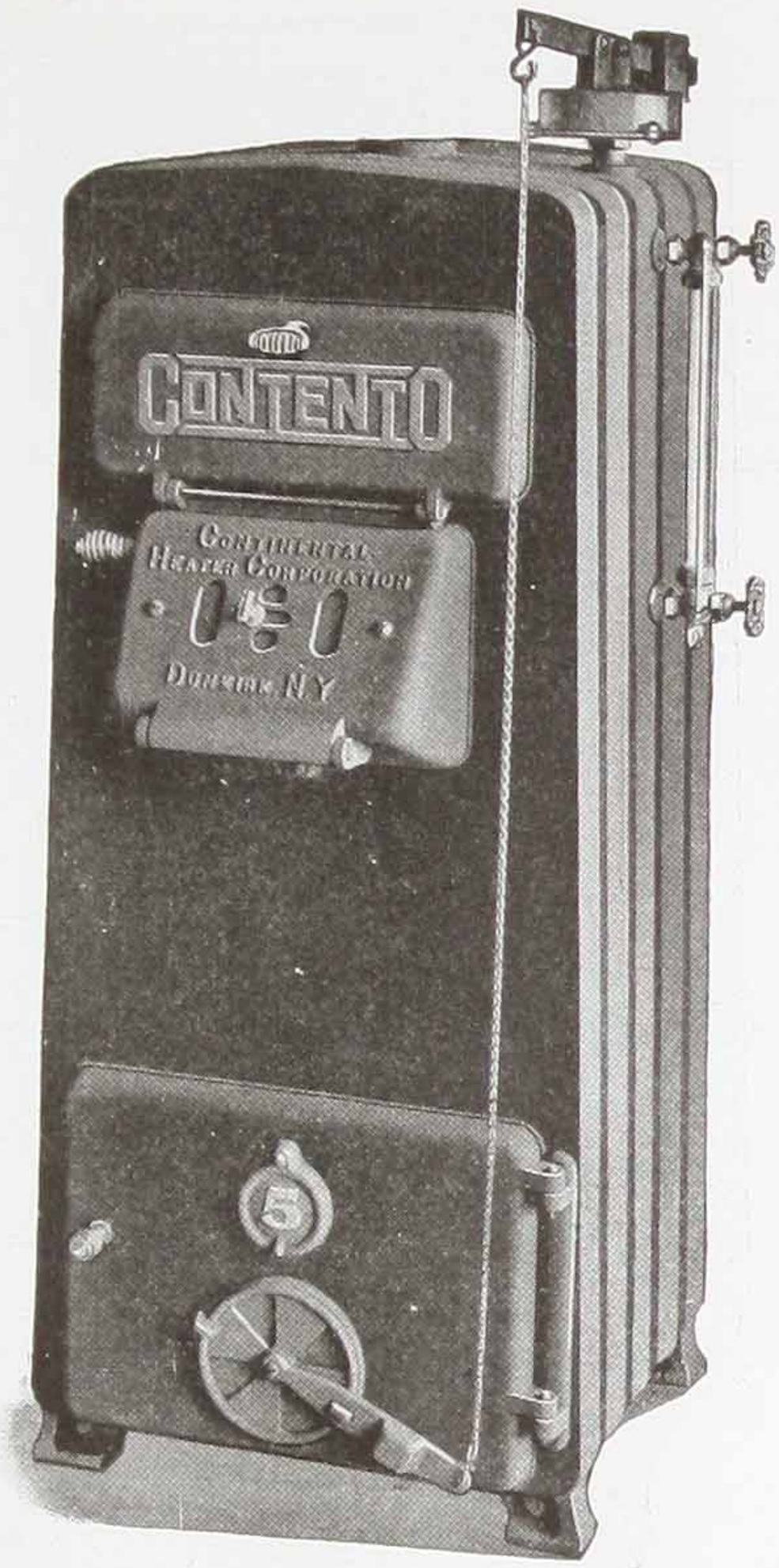
Continental Boilers are Built
for Better Heating



Contento Water Boiler

Contento Number	Water Rating	Radiating Value*	Fuel Capacity Pounds	Outside Length Inches	Extreme Height Inches
4	400	50	75	13½	45
5	535	60	100	17	45
6	670	70	125	20½	45
7	825	80	150	24	45

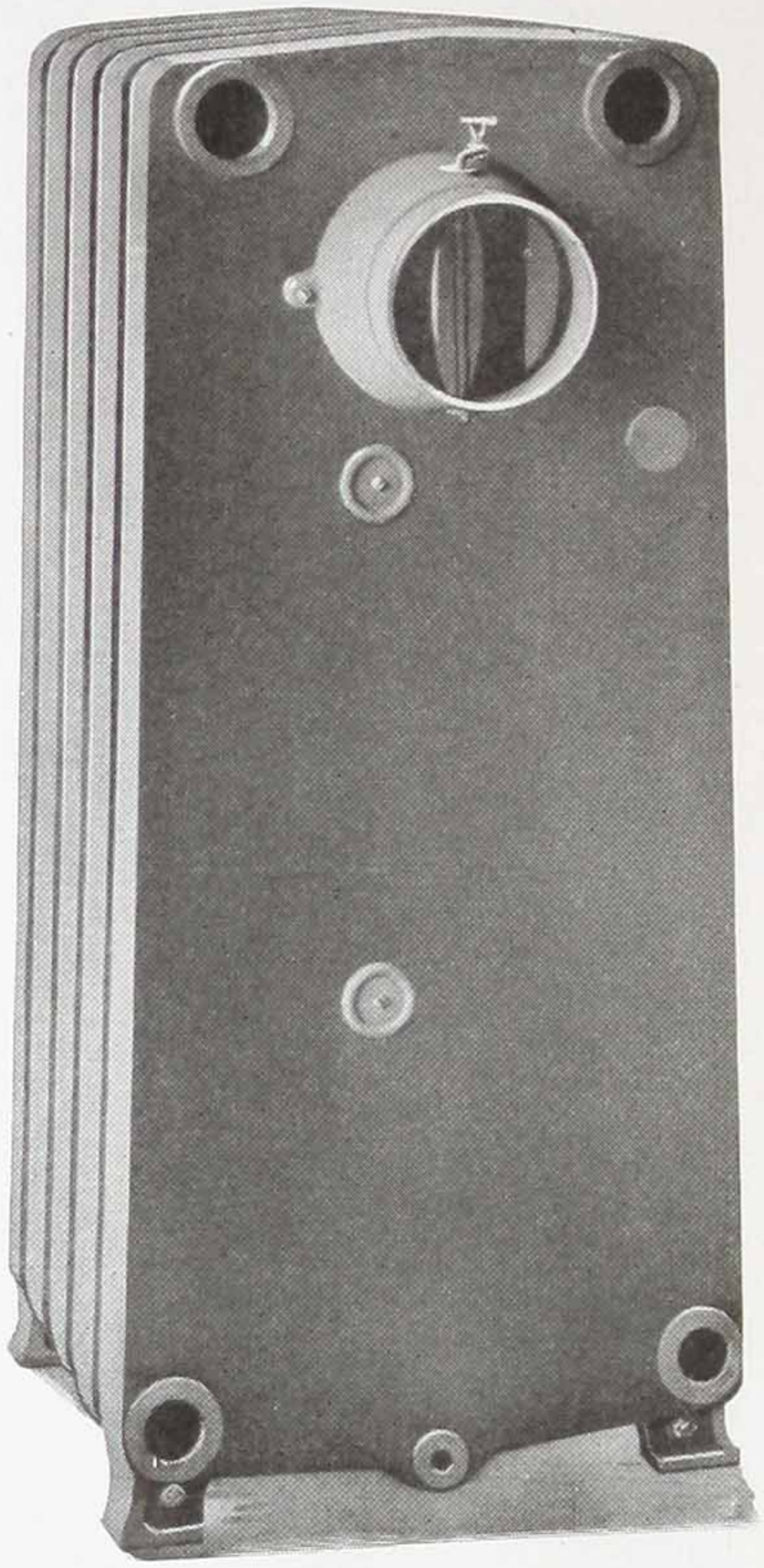
*Radiating value of Contento, piping and expansion tank.
Water boilers have two 2″ flow tappings and two 2″ return tappings.
All boilers are equipped with firing tools and ash pan.
Shipped assembled in one piece, carefully crated.



Contento Steam Boiler

Contento Number	Steam Rating Sq. Ft.	Fuel Capacity Pounds	Width at Bottom Inches	Outside Length Inches	Extreme Height Inches
4	240	75	19 ¾	13 ½	45
5	320	100	19 ¾	17	45
6	400	125	19 ¾	20 ¾	45
7	500	150	19 ¾	24	45

Steam boilers have intermediate tapped section with 2″ top outlet.
All boilers are equipped with firing tools, ash pan, and steam trimmings.
Shipped assembled in one piece, carefully crated.



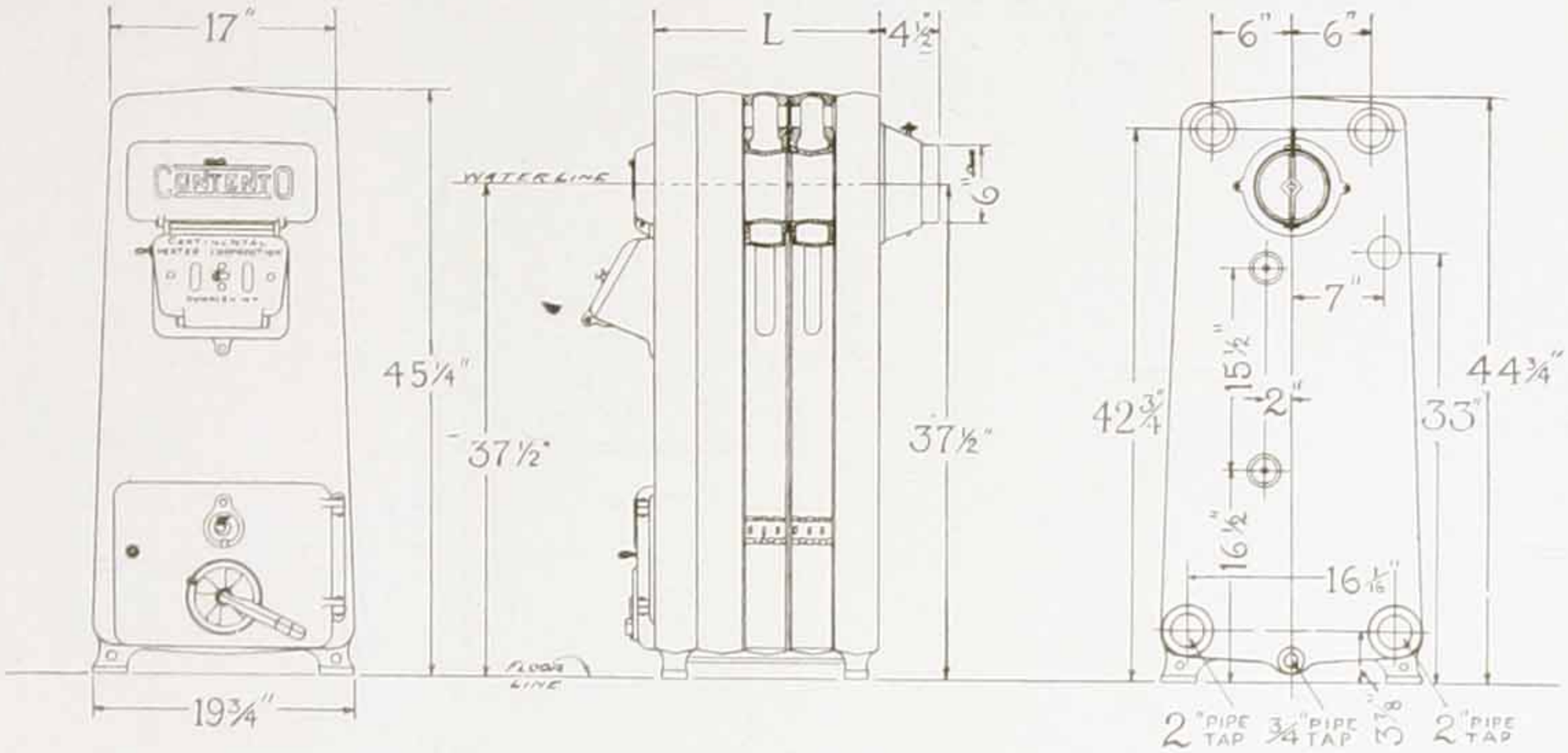
Contento Rear View

Check-draft damper for attachment to smokepipe can be supplied in addition to the 6″ round smoke hood shown above.

Steam boilers have special 1¼″ tapping in back section, three inches below water line, for Excelso type of water heaters.

Openings are provided in back section for a pipe coil.

Water boilers have two 2″ flow tappings, two 2″ return tappings and one ¾″ tapping for drain cock. Steam boilers have additional 2″ top outlet.



Contento Boiler Measurements

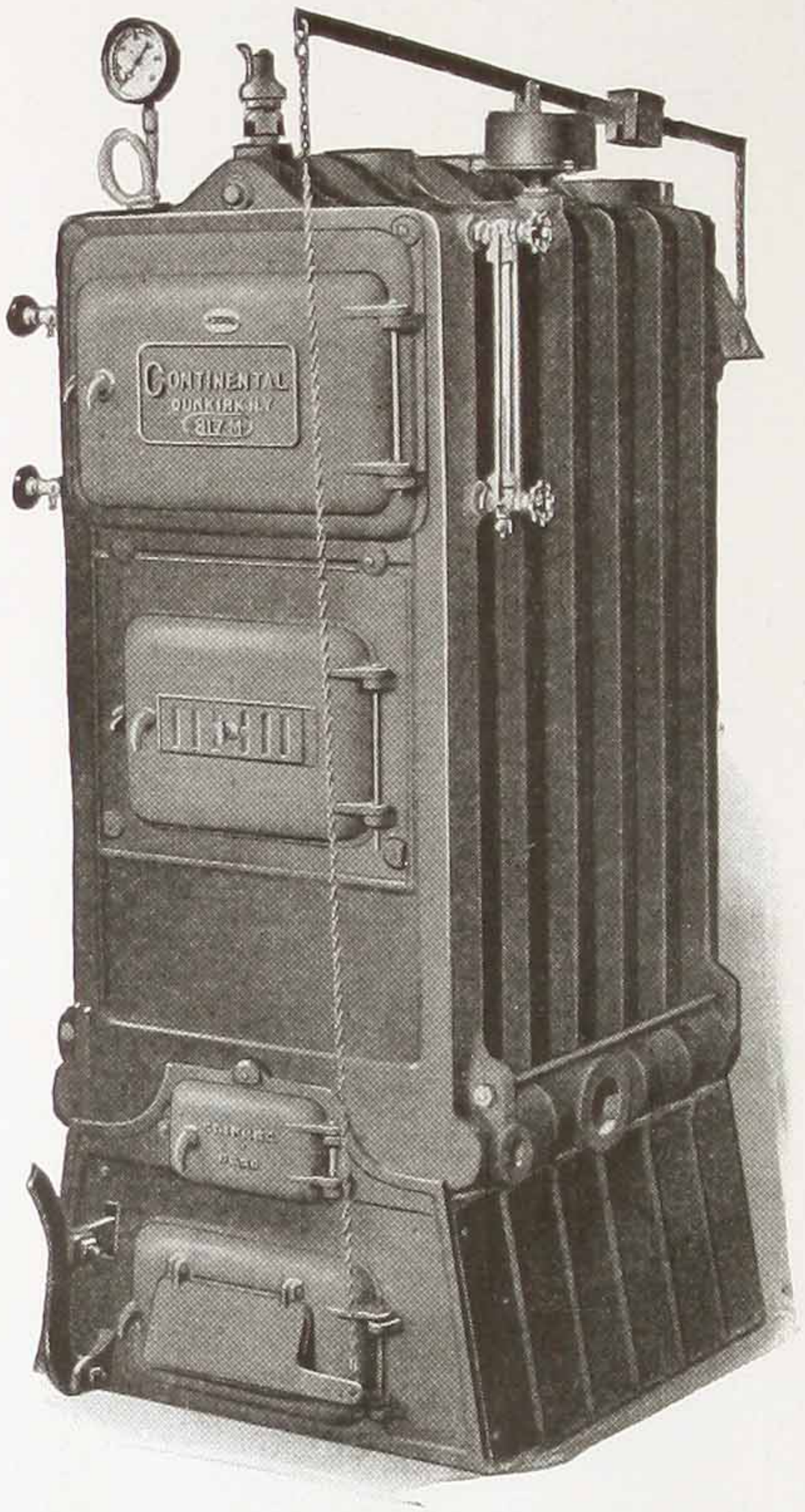
Contento Number	Water Rating	Steam Rating	Radiating Value*	Fuel Capacity Pounds	Width at Bottom Inches	L. Outside Length Inches	Extreme Height Inches
4	400	240	50	75	19¾	13½	45
5	535	320	60	100	19¾	17	45
6	670	400	70	125	19¾	20½	45
7	825	500	80	150	19¾	24	45

*Radiating value of Contento, piping and expansion tank.

Water boilers have two 2″ flow tappings, two 2″ return tappings and one ¾″ drain tapping. Four to six section steam boilers, inclusive, have one intermediate section with 2″ top outlet. Seven section steam boilers have two intermediate tapped sections.

All boilers are equipped with firing tools and ash pan. Steam boilers are equipped with complete set of steam trimmings, including metaphragm damper regulator. All boilers shipped assembled, carefully crated.

Being sectional, the boiler may be increased in size and heating capacity at any time the building is enlarged, by simply adding one or more sections.



Continental 17″ Steam Boiler

Boiler No.	Steam Rating Sq. Ft.	Fire Pot	Foundation	Extreme Overall Length	Flow and Return
S-417	450	17 x 13	26 x 17	33	2-2½″
S-517	600	17 x 17	26 x 22	37	2-2½″
S-617	750	17 x 21	26 x 26	41	2-2½″
S-717	900	17 x 25	26 x 30	45	3-2½″
S-817	1050	17 x 29	26 x 34	50	3-2½″

Water line, 48 inches.
Fire box depth, 16 inches.
Smoke pipe, 9 inches.

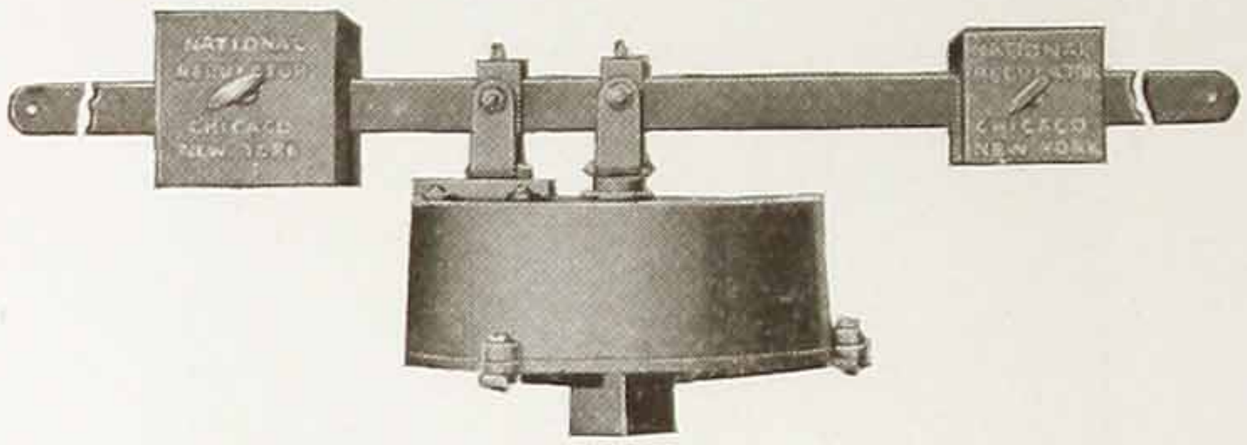
Height flow opening, 57½ inches.
Height return opening, 14¼ inches.
Smoke box extends 7½ inches.

Continental 17″ Water Boiler

Boiler No.	Water Rating Sq. Ft.	Fire Pot	Foundation	Extreme Overall Length	Flow and Return Tappings
W-417	750	17 x 13	26 x 17	33	2-2½″
W-517	1000	17 x 17	26 x 22	37	2-2½″
W-617	1250	17 x 21	26 x 26	41	2-2½″
W-717	1500	17 x 25	26 x 30	45	3-2½″
W-817	1750	17 x 29	26 x 34	50	3-2½″

Height flow opening, 57½ inches. Height return opening, 14¼ inches.
Fire box depth, 16 inches. Smoke pipe, 9 inches.
Smoke box extends back of boiler 7½ inches.

Draft Regulation



Type B—5½″
Metaphragm Damper Regulator

Fuel economy depends to a very great extent upon proper draft regulation. Every Continental Steam Boiler, from the smallest to the largest, is equipped with a Metaphragm Damper Regulator without additional charge. The Metaphragm was chosen as standard equipment, because it is compact, powerful, and very sensitive.

No. A Jr. 4″ Standard Contento Equipment—List price, $12.00.
Boiler connection, ½″ male—Shipping weight, 10 lbs.

No. A-4″ Standard 17″ and 20″ Boiler Equipment—List price, $15.00.
Boiler connection, ½″ male—Shipping weight, 15 lbs.

No. B-5½″ Standard 30″ and 40″ Series Boiler Equipment—List price,$18.00.
Boiler connection, ½″ female—Shipping weight, 20 lbs.

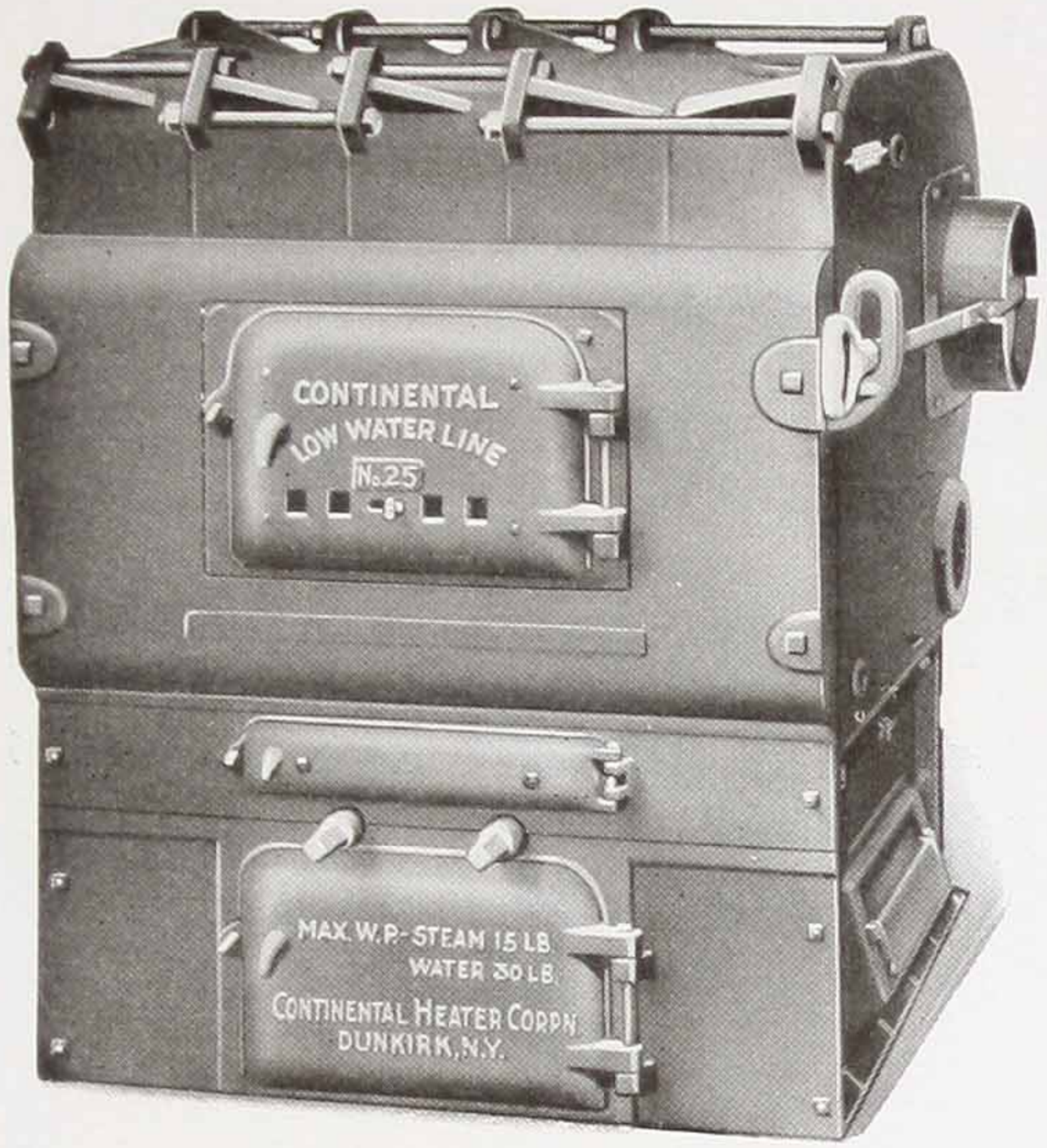
No. C-7″ For low pressure, Vacuum or Vapor—List price, $20.00.
Boiler connection, 1″ female—Shipping weight, 35 lbs.

No. D-10″ For Vapor or Vacuum—List price, $27.00.
Boiler connection, 1″ female—Shipping weight, 55 lbs.

No. C-7″ or D-10″ will be supplied instead of standard equipment for a small additional charge.

Thermostatic temperature regulators which automatically open and close the dampers at exactly the moment the room temperature rises and falls one degree above or one degree below the desired temperature, are big fuel-savers and a great convenience. The thermostat can be set for a lower temperature during the night, and a clock automatically changes the thermostat from the night to day temperature at any hour desired.

We recommend the use of damper regulators and clock devices which will open the dampers before arising time. They insure a warm house in the morning and save fuel, because the fire comes up gradually instead of being forced. There are several good types on the market. Ask your heating contractor for particulars.



No. 25—Single Series (Regular)

Continental Low Water Line Boiler

20 Series **Water Line 38 Inches** **Height Flow Opening 43 Inches**

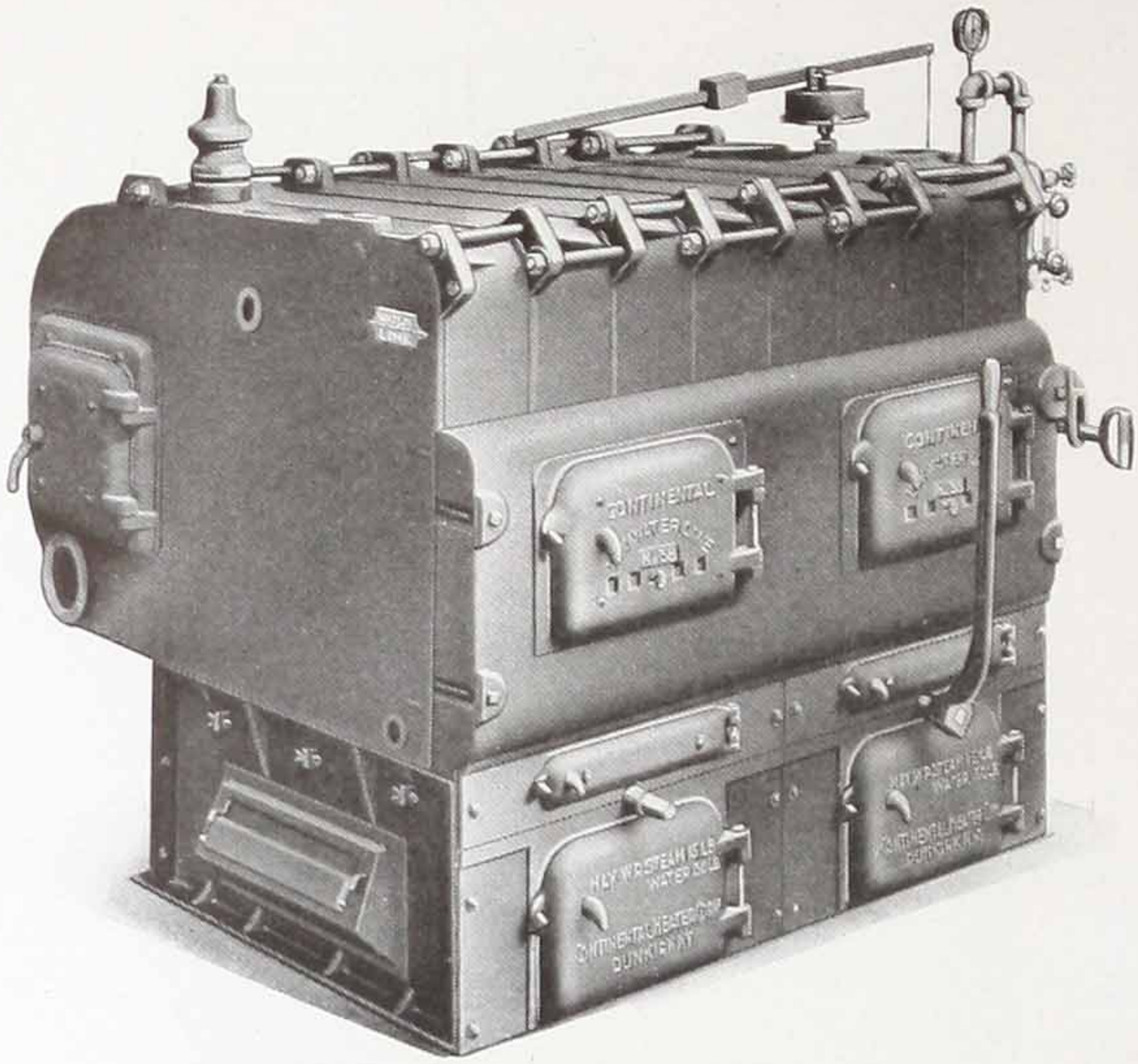
STEAM

Boiler No.	Rating Sq. Ft.	Outlets No. & Size	Grate Inches	Grate Area Sq. Ft.	No. Fire Doors	Chimney Area Inches	Chimney Height Feet
25-S	700	2—3″	20 x 28	3.88	1	8 x 12	40
26-S	900	2—3″	20 x 35	4.85	2	12 x 12	40
27-S	1,100	2—3″	20 x 42	5.82	2	12 x 12	40
28-S	1,300	2—3″	20 x 49	6.80	2	12 x 12	40

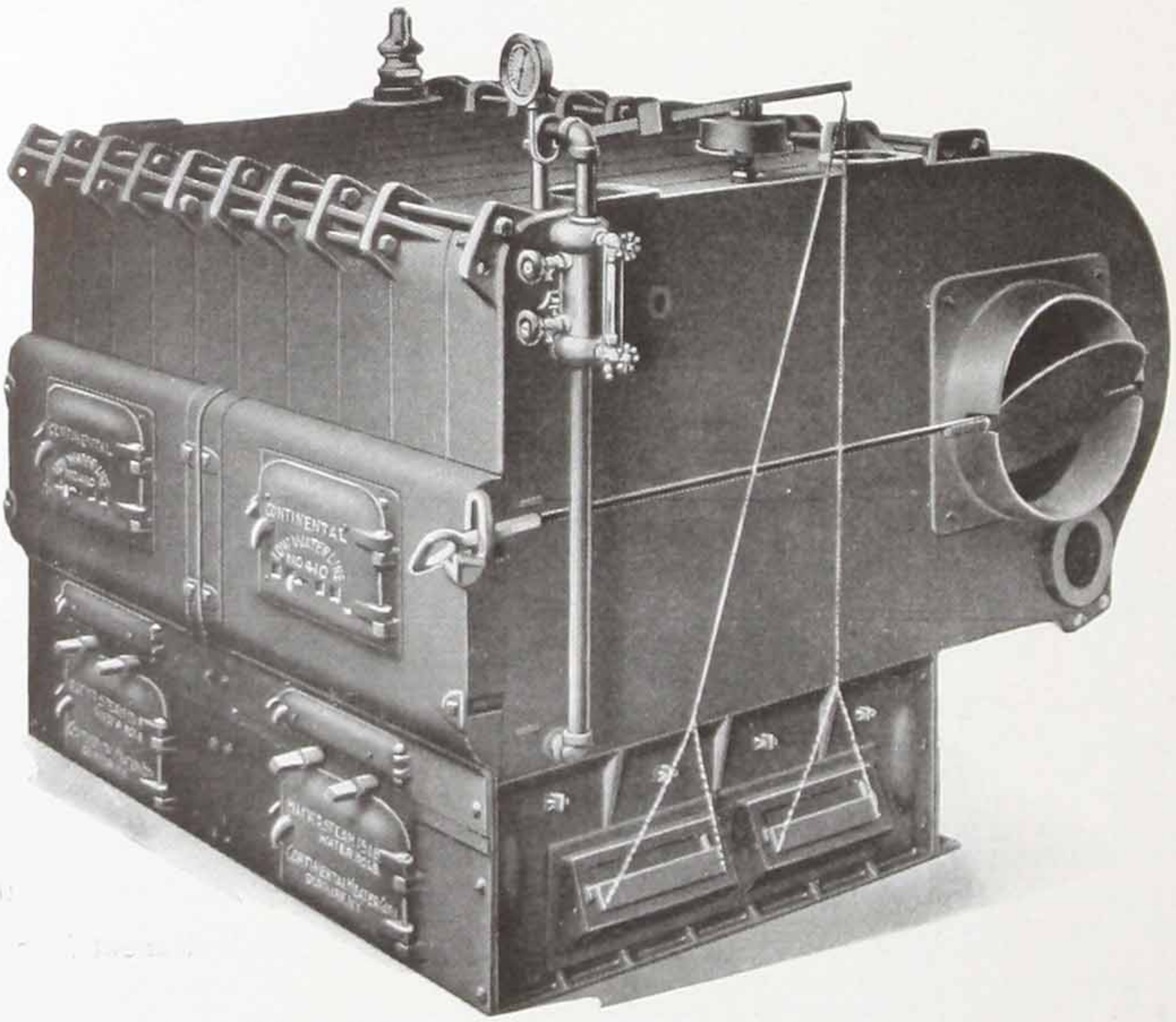
WATER

25-W	1,150	2—3″	20 x 28	3.88	1	8 x 12	40
26-W	1,500	2—3″	20 x 35	4.85	2	12 x 12	40
27-W	1,850	2—3″	20 x 42	5.82	2	12 x 12	40
28-W	2,200	2—3″	20 x 49	6.80	2	12 x 12	40

Each boiler has two 3″ flow tappings and two 3″ return tappings, located in the end sections of the boiler.
Smoke outlet can be taken from either end, being interchangeable with cleanout door.
Safety valve sizes in accordance with A. S. M. E. Code.
See pages 46 and 47 for additional measurements.



No. 38-S—Single Series (Regular)



No. 410-S—Single Series (Regular)

Continental Low Water Line Boiler Data

30 and 40 Single Series (Regular)

30-Series Water Line, 43 Inches — Height Flow Opening, 48 Inches
40-Series Water Line, 47 Inches — Height Flow Opening, 54 Inches

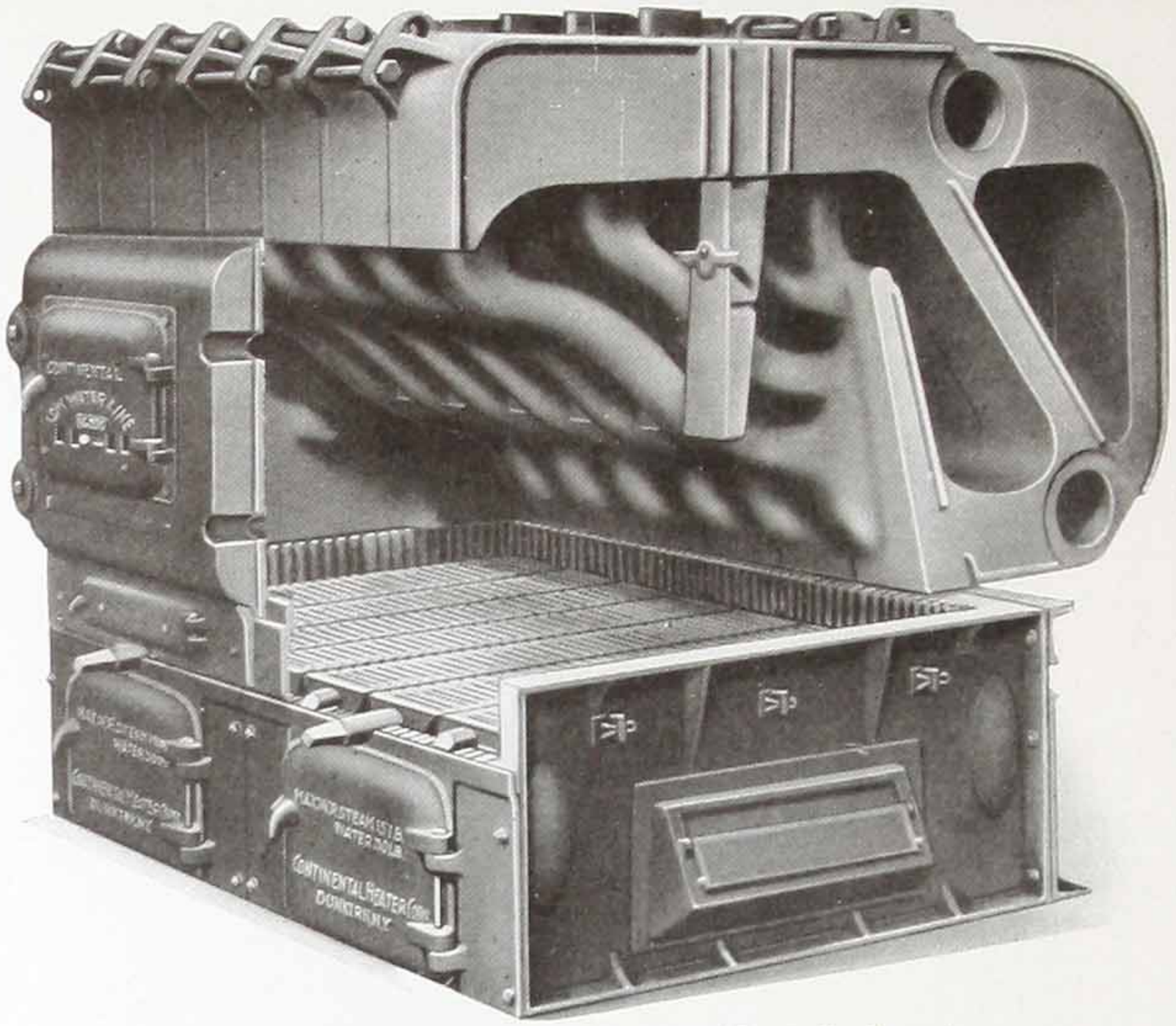
Steam Boilers

Boiler No.	Steam Rating Sq. Ft.	Outlets No. & Size	Grate Inches	Grate Area Sq. Ft.	No. Fire Doors	Chimney Area Inches	Chimney Height Feet
35-S	1,200	2—4″	30 x 28	5.83	1	12 x 12	40
36-S	1,600	2—4″	30 x 35	7.29	2	12 x 12	40
37-S	2,000	2—4″	30 x 42	8.75	2	12 x 12	40
38-S	2,400	2—4″	30 x 49	10.21	2	12 x 12	40
39-S	2,800	2—4″	30 x 56	11.67	2	12 x 16	40
310-S	3,200	2—4″	30 x 63	13.13	2	12 x 16	45
311-S	3,600	2—4″	30 x 70	14.59	3	12 x 16	45
312-S	4,000	2—4″	30 x 77	16.05	4	16 x 16	45
46-S	2,500	2—5″	40 x 35	9.72	2	12 x 16	50
47-S	3,200	2—5″	40 x 42	11.66	2	12 x 16	50
48-S	3,900	2—5″	40 x 49	13.60	2	16 x 16	50
49-S	4,600	2—5″	40 x 56	15.54	2	16 x 20	55
410-S	5,300	2—5″	40 x 63	17.48	2	16 x 20	55
411-S	6,000	2—5″	40 x 70	19.43	3	20 x 20	55
412-S	6,700	3—5″	40 x 77	21.35	4	20 x 20	60
413-S	7,400	3—5″	40 x 84	23.32	4	24 x 24	65
414-S	8,100	3—5″	40 x 91	25.27	4	24 x 24	65
415-S	8,800	3—5″	40 x 98	27.22	4	24 x 28	65
416-S	9,500	4—5″	40 x105	29.17	4	28 x 28	70
417-S	10,200	4—5″	40 x112	31.12	4	28 x 28	70
418-S	10,900	4—5″	40 x119	33.07	4	28 x 32	70

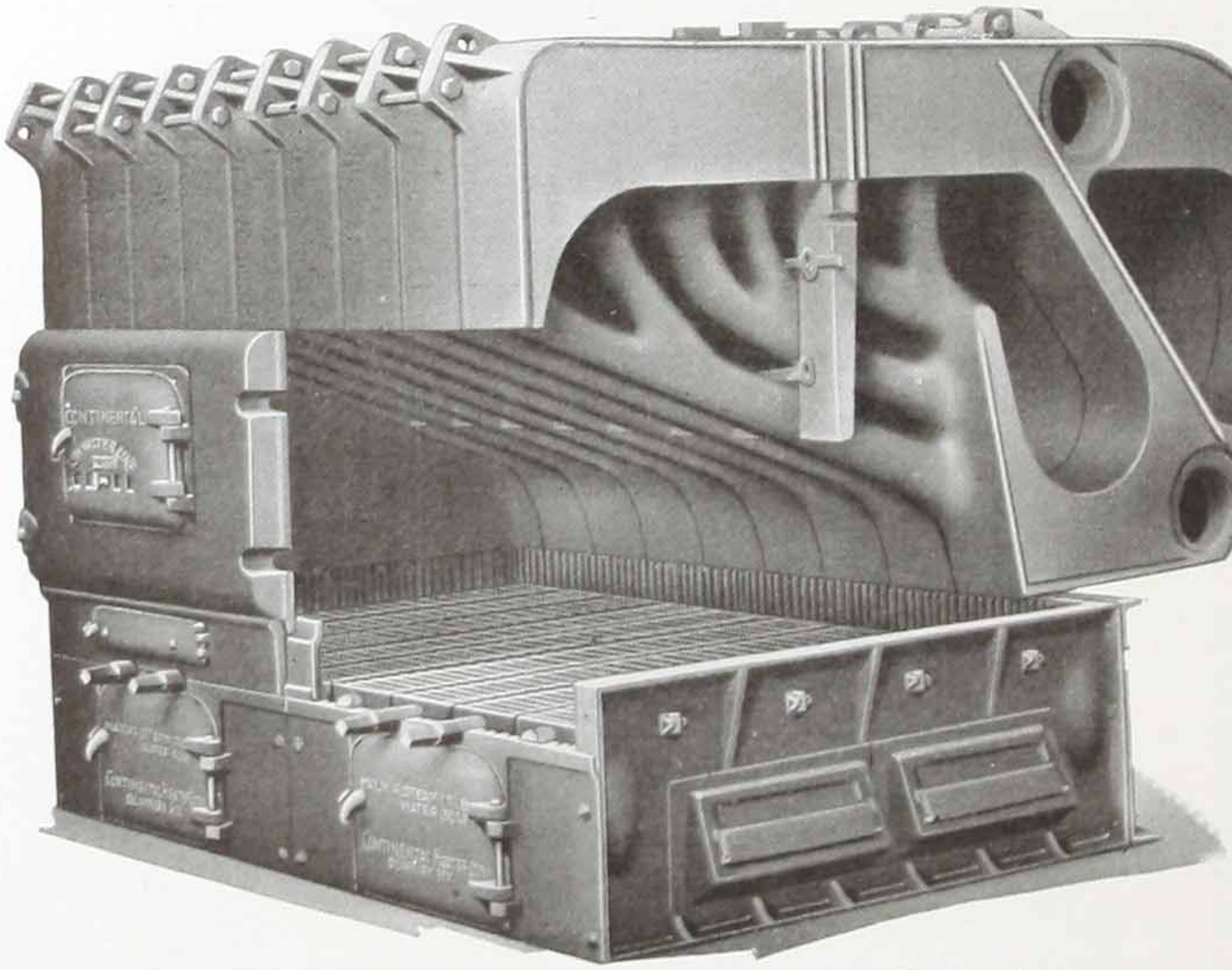
All boilers have at least two flow and two return tappings located in end sections.
Nos. 412 to 415 inclusive have an additional intermediate section with flow tapping.
Nos. 416 to 418 inclusive have two intermediate sections with flow tapping.
Safety valve sizes in accordance with A. S. M. E. Code.
See pages 46 and 47 for additional measurements.

Water Boilers

Boiler No.	Water Rating Sq. Ft.	Outlets No. & Size	Grate Inches	Grate Area Sq. Ft.	No. Fire Doors	Chimney Area Inches	Chimney Height Feet
35-W	2,000	2—4″	30 x 28	5.83	1	12 x 12	40
36-W	2,650	2—4″	30 x 35	7.29	2	12 x 12	40
37-W	3,300	2—4″	30 x 42	8.75	2	12 x 12	40
38-W	4,000	2—4″	30 x 49	10.21	2	12 x 12	40
39-W	4,650	2—4″	30 x 56	11.67	2	12 x 16	40
310-W	5,300	2—4″	30 x 63	13.13	2	12 x 16	45
311-W	6,000	2—4″	30 x 70	14.59	2	12 x 16	45
312-W	6,650	2—4″	30 x 77	16.05	2	16 x 16	45
46-W	4,150	2—5″	40 x 35	9.72	2	12 x 16	50
47-W	5,300	2—5″	40 x 42	11.66	2	12 x 16	50
48-W	6,450	2—5″	40 x 49	13.60	2	16 x 16	50
49-W	7,600	2—5″	40 x 56	15.54	2	16 x 20	55
410-W	8,750	2—5″	40 x 63	17.48	2	16 x 20	55
411-W	9,900	2—5″	40 x 70	19.43	3	20 x 20	55
412-W	11,100	3—5″	40 x 77	21.35	4	20 x 20	60
413-W	12,250	3—5″	40 x 84	23.32	4	24 x 24	65
414-W	13,400	3—5″	40 x 91	25.27	4	24 x 24	65
415-W	14,550	3—5″	40 x 98	27.22	4	24 x 28	65
416-W	15,700	4—5″	40 x105	29.17	4	28 x 28	70
417-W	16,850	4—5″	40 x112	31.12	4	28 x 28	70
418-W	18,000	4—5″	40 x119	33.07	4	28 x 32	70



No. 830—Single Series (Smokeless)



No. 1040—Single Series (Smokeless)

Continental Low Water Line Boiler Data

30 and 40—Single Series (Smokeless)

30-Series Water Line, 43 Inches — Height Flow Opening, 48 Inches
40-Series Water Line, 47 Inches — Height Flow Opening, 54 Inches

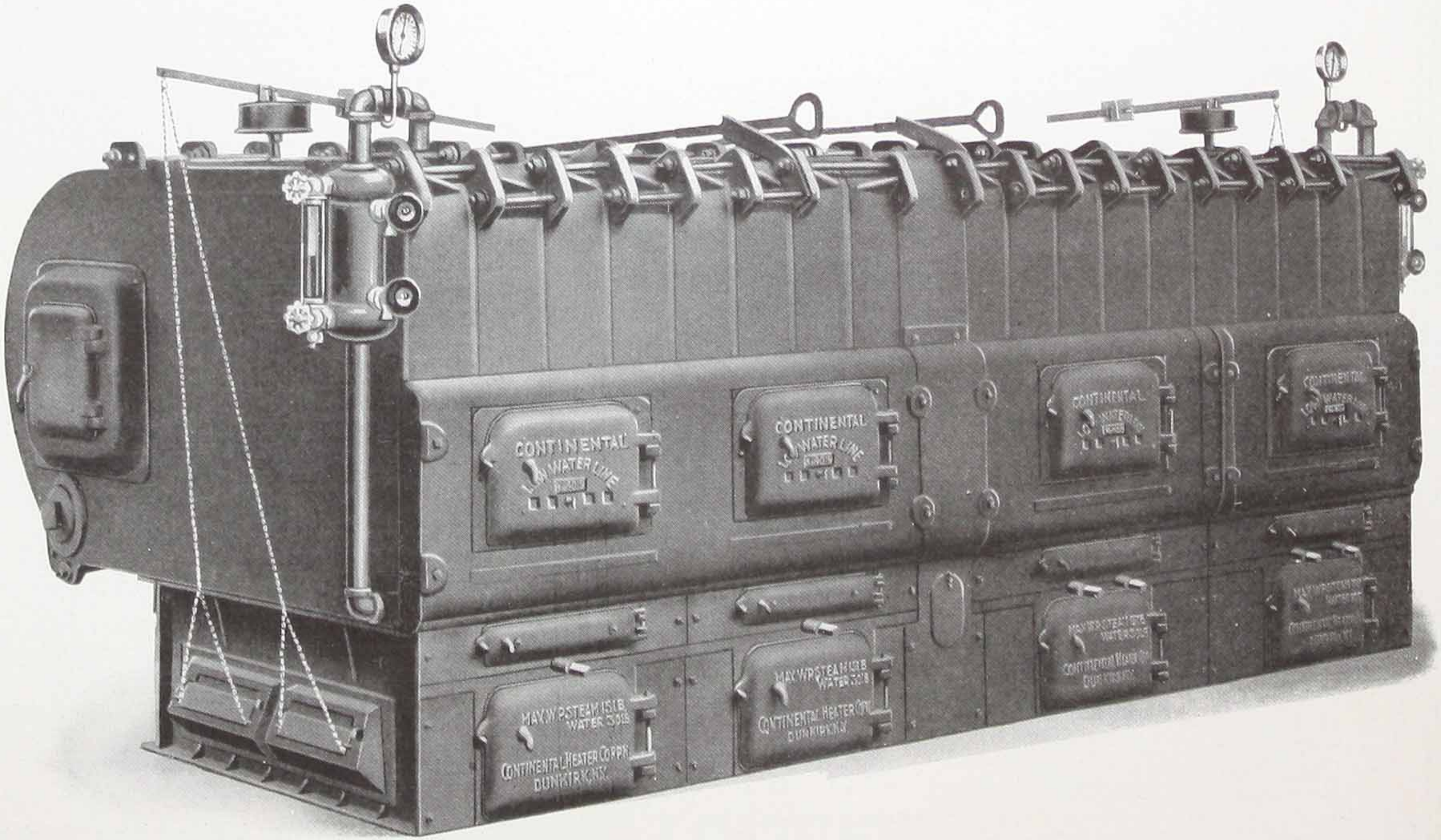
Smokeless Steam Boilers

Boiler No.	Steam Rating Sq. Ft.	Outlets No. & Size	Grate Inches	Grate Area Sq. Ft.	No. Fire Doors	Chimney Area Inches	Chimney Height Feet
530-S	1,200	2—4″	30 x 28	5.83	1	12 x 12	40
630-S	1,600	2—4″	30 x 35	7.29	2	12 x 12	40
730-S	2,000	2—4″	30 x 42	8.75	2	12 x 12	40
830-S	2,400	2—4″	30 x 49	10.21	2	12 x 12	40
930-S	2,800	2—4″	30 x 56	11.67	2	12 x 16	40
1030-S	3,200	2—4″	30 x 63	13.13	2	12 x 16	45
1130-S	3,600	2—4″	30 x 70	14.59	3	12 x 16	45
1230-S	4,000	2—4″	30 x 77	16.05	4	16 x 16	45
640-S	2,500	2—5″	40 x 35	9.72	2	12 x 16	50
740-S	3,200	2—5″	40 x 42	11.66	2	12 x 16	50
840-S	3,900	2—5″	40 x 49	13.60	2	16 x 16	50
940-S	4,600	2—5″	40 x 56	15.54	2	16 x 20	55
1040-S	5,300	2—5″	40 x 63	17.48	2	16 x 20	55
1140-S	6,000	2—5″	40 x 70	19.43	3	20 x 20	55
1240-S	6,700	3—5″	40 x 77	21.35	4	20 x 20	60
1340-S	7,400	3—5″	40 x 84	23.32	4	24 x 24	65
1440-S	8,100	3—5″	40 x 91	25.27	4	24 x 24	65
1540-S	8,800	3—5″	40 x 98	27.22	4	24 x 28	65
1640-S	9,500	4—5″	40 x105	29.17	4	28 x 28	70
1740-S	10,200	4—5″	40 x112	31.12	4	28 x 28	70
1840-S	10,900	4—5″	40 x119	33.07	4	28 x 32	70

All boilers have at least two flow and two return tappings located in end sections.
Nos. 412 to 415 inclusive have an additional intermediate section with flow tapping.
Nos. 416 to 418 inclusive have two intermediate sections with flow tapping.
Safety valves in accordance with A. S. M. E. Code.
See pages 46 and 47 for additional measurements.

Smokeless Water Boilers

Boiler No.	Water Rating Sq. Ft.	Outlets No. & Size	Grate Inches	Grate Area Sq. Ft.	No. Fire Doors	Chimney Area Inches	Chimney Height Feet
530-W	2,000	2—4″	30 x 28	5.83	1	12 x 12	40
630-W	2,650	2—4″	30 x 35	7.29	2	12 x 12	40
730-W	3,300	2—4″	30 x 42	8.75	2	12 x 12	40
830-W	4,000	2—4″	30 x 49	10.21	2	12 x 12	40
930-W	4,650	2—4″	30 x 56	11.67	2	12 x 16	40
1030-W	5,300	2—4″	30 x 63	13.13	2	12 x 16	45
1130-W	6,000	2—4″	30 x 70	14.59	2	12 x 16	45
1230-W	6,650	2—4″	30 x 77	16.05	2	16 x 16	45
640-W	4,150	2—5″	40 x 35	9.72	2	12 x 16	50
740-W	5,300	2—5″	40 x 42	11.66	2	12 x 16	50
840-W	6,450	2—5″	40 x 49	13.60	2	16 x 16	50
940-W	7,600	2—5″	40 x 56	15.54	2	16 x 20	55
1040-W	8,750	2—5″	40 x 63	17.48	2	16 x 20	55
1140-W	9,900	2—5″	40 x 70	19.43	3	20 x 20	55
1240-W	11,100	3—5″	40 x 77	21.35	4	20 x 20	60
1340-W	12,250	3—5″	40 x 84	23.32	4	24 x 24	65
1440-W	13,400	3—5″	40 x 91	25.27	4	24 x 24	65
1540-W	14,550	3—5″	40 x 98	27.22	4	24 x 28	65
1640-W	15,700	4—5″	40 x105	29.17	4	28 x 28	70
1740-W	16,850	4—5″	40 x112	31.12	4	28 x 28	70
1840-W	18,000	4—5″	40 x119	33.07	4	28 x 32	70



Continental Low Water Line Boiler—Double Series

Continental Low Water Line Boilers

Regular and Smokeless—Double Series

30-Series Water Line 43 Inches Height Flow Opening 48 Inches

Boiler No.	Steam Rating Sq. Ft.	Outlets No. & Size	Grate Area Sq. Ft.	Chimney Area Inches	Chim. Ht. Ft.	Boiler No.	Water Rating Sq. Ft.	Outlets No. & Size
3011-S	2600	4—4″	11.66	16 x 16	50	3011–W	4350	4—4″
3012-S	3000	4—4″	13.12	16 x 16	50	3012–W	5000	4—4″
3013-S	3400	4—4″	14.58	16 x 16	50	3013–W	5650	4—4″
3014-S	3800	4—4″	16.04	16 x 20	50	3014–W	6300	4—4″
3015-S	4200	4—4″	17.50	16 x 20	50	3015–W	6950	4—4″
3016-S	4600	4—4″	18.96	16 x 20	55	3016–W	7650	4—4″
3017-S	5000	4—4″	20.42	20 x 20	60	3017–W	8350	4—4″
3018-S	5400	4—4″	21.88	20 x 20	60	3018–W	9000	4—4″
3019-S	5800	4—4″	23.34	20 x 20	60	3019–W	9650	4—4″
3020-S	6200	4—4″	24.80	20 x 24	65	3020–W	10300	4—4″
3021-S	6600	4—4″	26.26	20 x 24	65	3021–W	10950	4—4″
3022-S	7000	4—4″	28.72	20 x 24	65	3022–W	11650	4—4″
3023-S	7400	4—4″	30.18	24 x 24	70	3023–W	12350	4—4″
3024-S	7800	4—4″	31.64	24 x 24	70	3024–W	13000	4—4″
3025-S	8200	4—4″	33.10	24 x 24	70	3025–W	13650	4—4″

Each 30″ double-series boiler has four 4″ flows and two 4″ return tappings. They are located in the end sections of the two boilers which make up the double boiler. See plan view, page 48.

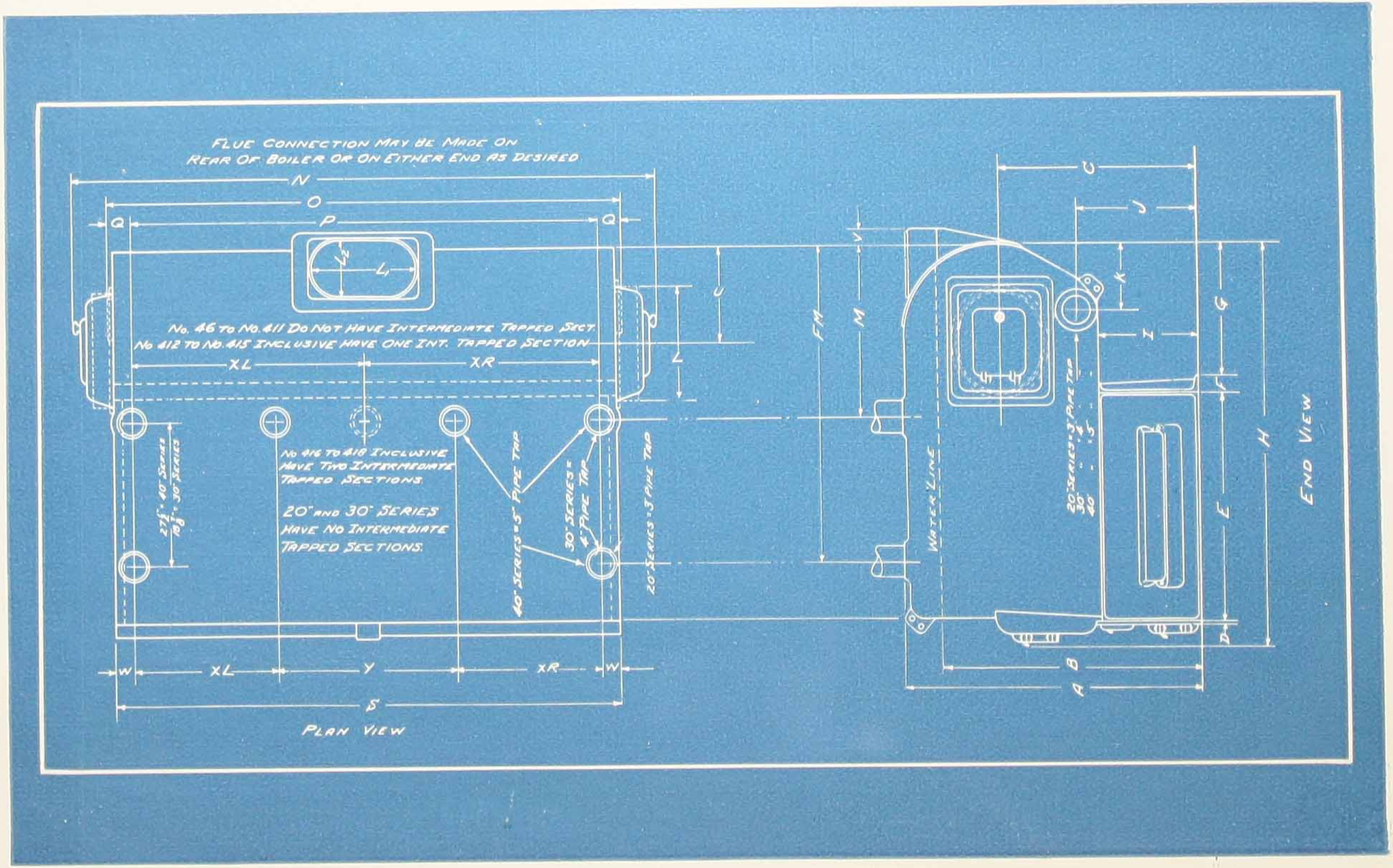
Continental Low Water Line Boilers

Regular and Smokeless—Double Series

40-Series Water Line 47 Inches Height Flow Opening 54 Inches

Boiler No.	Steam Rating Sq. Ft.	Outlets No. & Size	Grate Area Sq. Ft.	Chimney Area Inches	Chim. Ht. Ft.	Boiler No.	Water Rating Sq. Ft	Outlets No. & Size
4013-S	5500	4—5″	19.44	20 x 24	60	4013–W	9000	4—5″
4014-S	6200	4—5″	21.38	20 x 24	60	4014–W	10150	4—5″
4015-S	6900	4—5″	23.32	20 x 24	60	4015–W	11300	4—5″
4016-S	7600	4—5″	25.26	24 x 24	65	4016–W	12450	4—5″
4017-S	8300	4—5″	27.20	24 x 24	65	4017–W	13600	4—5″
4018-S	9000	4—5″	29.14	24 x 24	65	4018–W	14750	4—5″
4019-S	9700	4—5″	31.08	24 x 28	70	4019–W	15900	4—5″
4020-S	10400	4—5″	33.02	24 x 28	70	4020–W	17050	4—5″
4021-S	11100	4—5″	34.96	24 x 28	70	4021–W	18200	4—5″
4022-S	11800	4—5″	36.90	28 x 28	70	4022–W	19350	4—5″
4023-S	12500	4—5″	38.84	28 x 28	70	4023–W	20500	4—5″
4024-S	13200	5—5″	40.78	28 x 28	70	4024–W	21700	5—5″
4025-S	13900	6—5″	42.70	28 x 28	75	4025–W	22900	6—5″
4026-S	14600	6—5″	44.66	28 x 28	75	4026–W	24050	6—5″
4027-S	15300	6—5″	46.62	28 x 28	75	4027–W	25200	6—5″
4028-S	16000	6—5″	48.58	28 x 32	80	4028–W	26300	6—5″
4029-S	16700	6—5″	50.54	32 x 32	80	4029–W	27500	6—5″
4030-S	17400	6—5″	52.50	32 x 32	80	4030–W	28600	6—5″
4031-S	18100	6—5″	54.46	32 x 32	85	4031–W	29800	6—5″
4032-S	18800	7—5″	56.42	30 x 36	85	4032–W	30950	7—5″
4033-S	19500	8—5″	58.38	30 x 36	85	4033–W	32100	8—5″
4034-S	20200	8—5″	60.34	30 x 36	90	4034–W	33250	8—5″
4035-S	20900	8—5″	62.30	30 x 36	90	4035–W	34400	8—5″
4036-S	21600	8—5″	64.26	30 x 36	90	4036–W	35550	8—5″
4037-S	22300	8—5″	66.22	30 x 36	90	4037–W	36700	8—5″

If a smokeless boiler is wanted, mark order "Smokeless".
See plan view, page 48, for measurements and tappings.


FLUE CONNECTION MAY BE MADE ON
REAR OF BOILER OR ON EITHER END AS DESIRED
No. 46 TO No. 411 DO NOT HAVE INTERMEDIATE TAPPED SECT.
No 412 TO No. 415 INCLUSIVE HAVE ONE INT. TAPPED SECTION
No 416 TO 418 INCLUSIVE HAVE TWO INTERMEDIATE TAPPED SECTIONS.
20" AND 30" SERIES HAVE NO INTERMEDIATE TAPPED SECTIONS.
40" SERIES = 5" PIPE TAP
30" SERIES = 4" PIPE TAP
20" SERIES = 3" PIPE TAP
PLAN VIEW
WATER LINE
END VIEW

Continental Low Water Line Boilers

Measurements in Inches—Smokeless and Regular Type—Single Series

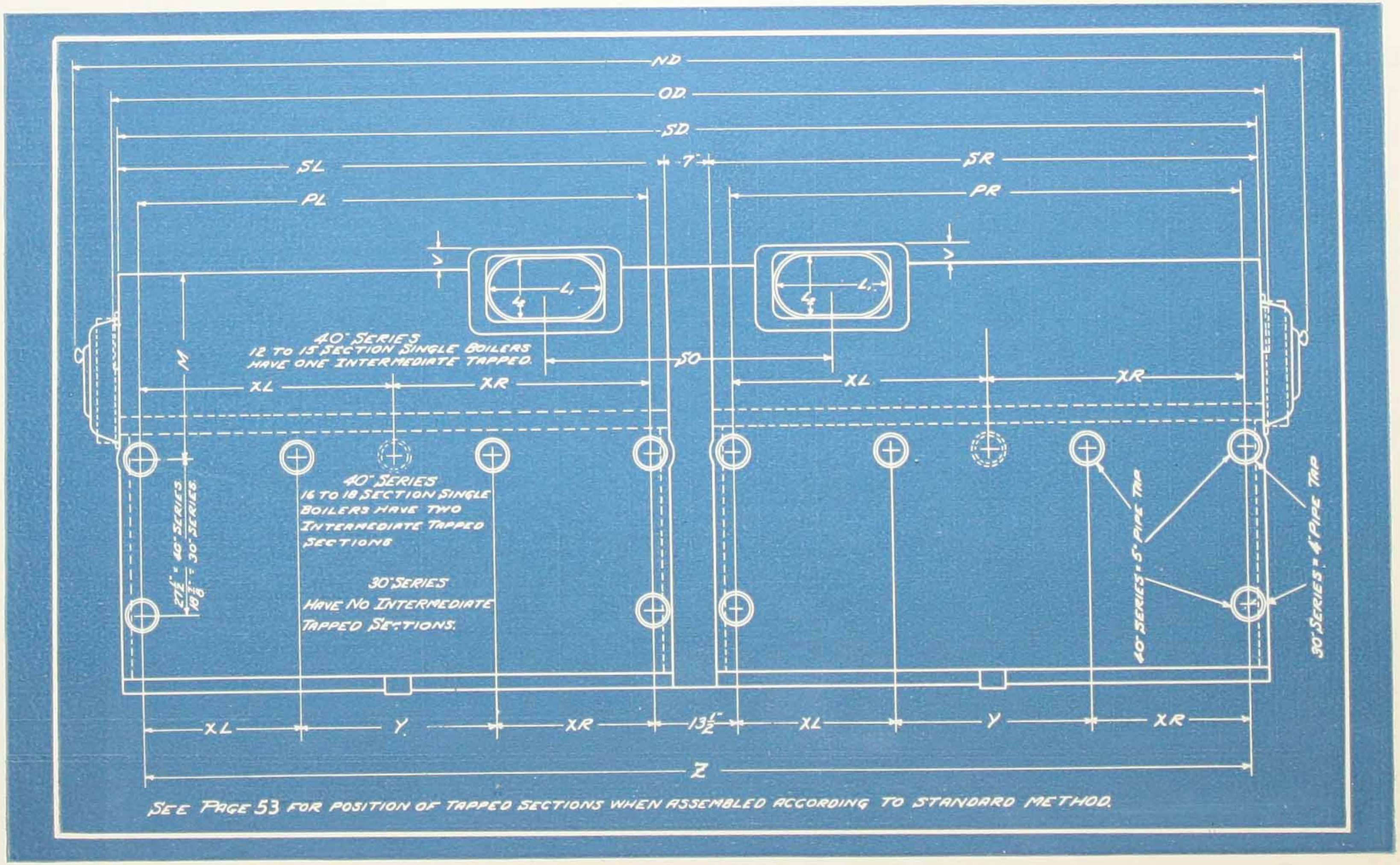
		Series 20	Series 30	Series 40
A	Height Flow Opening	43	48	54
B	Height Water Line	38	43	47
C*	Height to Center Smoke Collar (End Outlet)	31½	31	35
D	Thickness Base Front	½	½	½
E	Ash Pit Inside, Front to Back	23¾	33¾	43¾
F	Thickness Bottom Flange, Base Back	3	3	3
G	From Back of Base to Back of Boiler	8	12	26
H	From Front to Back of Boiler	39½	54½	79
I	Height of Base	16	16	16
J	Height Center Return Opening	19⅛	19¼	20¼
K	Center of Return; Opening from Rear of Boiler	10	6	13⅛
L1	Oval Rear Flue Opening, Length		15	21½
L2	Oval Rear Flue Opening, Width		10½	12
L	Diameter of Smoke Collar	9	12	18
FM	Center of Front Flow Opening to Rear of Boiler	26	38⅝	62
M	Center of Flow Opening to Rear of Boiler		20½	34½
Q	Center Flow Opening from End of Boiler	3½	3½	3¾
T	Grate to Center Fire Door	16½	16½	16½
	*Center Smoke Collar from Rear of Boiler	9½	10	20
V	Smoke Hood extends Back of Boiler when rear Smoke Hood is used			4½
	Rear oval Smoke Outlet, Length		15	21½
	Rear oval Smoke Outlet, Width		10½	12
	Fire Doors 10½″ x 15½″ (All boilers)			

*This does not apply to double boilers which have two oval smoke hoods even with top of boiler at rear. Single boilers having more than ten sections also have rear smoke outlet.

The measurements given above are based on the sections being drawn up to seven-inch centers.

Pipe measurements should be taken after boiler is erected as there may be a variance due to boiler sections not being drawn up exactly to seven-inch centers.

Boiler Numbers			N Overall	O Face Returns	P c to c Flows	R Length Ash Pit	S Length Base	XL c of Left End Flow to c Intermediate Flow	XR c of Right End Flow to c Intermediate Flow	Y c to c Two Intermediate Flows
25	**530**	**35**	39	36½	28½	31½	35			
26	**630**	**36**	46	43½	35½	38½	42			
27	**730**	**37**	53	50½	42½	45½	49			
28	**830**	**38**	60	57½	49½	52½	56			
	930	**39**	67	64½	56½	59½	63			
	1030	**310**	74	71½	63½	66½	70			
	1130	**311**	81	78½	70½	73½	77			
	1230	**312**	88	85½	77½	80½	84			
640	**46**		53	43½	35½	38½	42			
740	**47**		60	50½	42½	45½	49			
840	**48**		67	57½	49½	52½	56			
940	**49**		74	64½	56½	59½	63			
1040	**410**		81	71½	63½	66½	70			
1140	**411**		88	78½	70½	73½	77			
1240	**412**		95	85½	77½	80½	84	35¼	42¼	
1340	**413**		102	92½	84½	87½	91	42¼	42¼	
1440	**414**		109	99½	91½	94½	98	42¼	49¼	
1540	**415**		116	106½	98½	101½	105	49¼	49¼	
1640	**416**		123	113½	105½	108½	112	35¼	35¼	35
1740	**417**		130	120½	112½	115½	119	35¼	35¼	42
1840	**418**		137	127½	119½	122½	126	42¼	42¼	35



SEE PAGE 53 FOR POSITION OF TAPPED SECTIONS WHEN ASSEMBLED ACCORDING TO STANDARD METHOD.

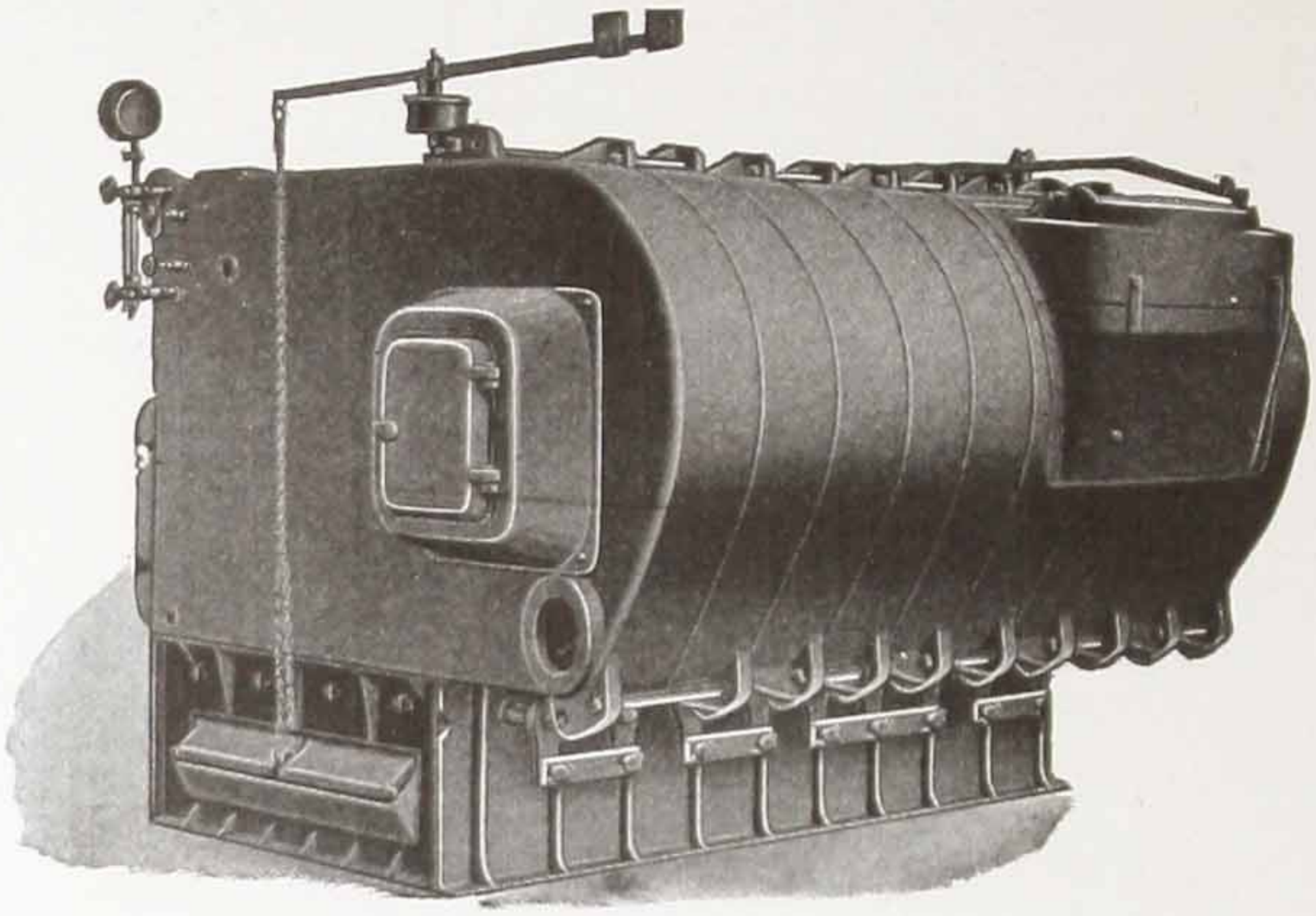
Continental Low Water Line Boilers

Measurements in Inches Smokeless and Regular Type—Double Series

Boiler Number	ND Overall Length	SD Total Length Complete Base	Z c to c Extreme End Flows	OD Face of Returns	SO c to c Smoke Outlet	Left Part Double Boiler						Right Part Double Boiler					
						Number of Sections	SR Length of Base	PR c to c End Flows	XL c Left Flow to c Int. Flow	XR c Right Flow to c Int. Flow	Y c to c of Two Int. Flows	Number of Sections	SR Length of Base	PR c to c End Flows	XL c Left Flow to c Int. Flow	XR c Right Flow to c Int. Flow	Y c to c Two Int. Flows
3011	81	77	70½	78½	36	5	35	28½				5	35	28½			
3012	88	84	77½	85½	36	5	35	28½				6	42	35½			
3013	95	91	84½	92½	36	6	42	35½				6	42	35½			
3014	102	98	91½	99½	36	6	42	35½				7	49	42½			
3015	109	105	98½	106½	36	7	49	42½				7	49	42½			
3016	116	112	105½	113½	36	7	49	42½				8	56	49½			
3017	123	119	112½	120½	36	8	56	49½				8	56	49½			
3018	130	126	119½	127½	36	8	56	49½				9	63	56½			
3019	137	133	126½	134½	36	9	63	56½				9	63	56½			
3020	144	140	133½	141½	36	9	63	56½				10	70	63½			
3021	151	147	140½	148½	36	10	70	63½				10	70	63½			
3022	158	154	147½	155½	36	10	70	63½				11	77	70½			
3023	165	161	154½	162½	36	11	77	70½				11	77	70½			
3024	172	168	161½	169½	36	11	77	70½				12	84	77½			
3025	179	175	168½	176½	36	12	84	77½				12	84	77½			
4013	107	91	84½	92½	42½	6	42	35½				6	42	35½			
4014	114	98	91½	99½	42½	6	42	35½				7	49	42½			
4015	121	105	98½	106½	42½	7	49	42½				7	49	42½			
4016	128	112	105½	113½	42½	7	49	42½				8	56	49½			
4017	135	119	112½	120½	42½	8	56	49½				8	56	49½			
4018	142	126	119½	127½	42½	8	56	49½				9	63	56½			
4019	149	133	126½	134½	42½	9	63	56½				9	63	56½			
4020	156	140	133½	141½	42½	9	63	56½				10	70	63½			
4021	163	147	140½	148½	42½	10	70	63½				10	70	63½			
4022	170	154	147½	155½	42½	10	70	63½				11	77	70½			
4023	177	161	154½	162½	42½	11	77	70½				11	77	70½			
4024	184	168	161½	169½	42½	11	77	70½				12	84	77½	42¼	35¼	
4025	191	175	168½	176½	42½	12	84	77½	35¼	42¼		12	84	77½	42¼	35¼	
4026	198	182	175½	183½	42½	12	84	77½	35¼	42¼		13	91	84½	42¼	42¼	
4027	205	189	182½	190½	42½	13	91	84½	42¼	42¼		13	91	84½	42¼	42¼	
4028	212	196	189½	197½	42½	13	91	84½	42¼	42¼		14	98	91½	49¼	42¼	
4029	219	203	196½	204½	42½	14	98	91½	42¼	49¼		14	98	91½	49¼	42¼	
4030	226	210	203½	211½	42½	14	98	91½	42¼	49¼		15	105	98½	49¼	49¼	
4031	233	217	210½	218½	42½	15	105	98½	49¼	49¼		15	105	98½	49¼	49¼	
4032	240	224	217½	225½	105½	15	105	98½	35¼	63¼		16	112	105½	35¼	35¼	35
4033	247	231	224½	232½	112½	16	112	105½	35¼	35¼	35	16	112	105½	35¼	35¼	35
4034	254	238	231½	239½	112½	16	112	105½	35¼	35¼	35	17	119	112½	35¼	35¼	42
4035	261	245	238½	246½	119½	17	119	112½	35¼	35¼	42	17	119	112½	35¼	35¼	42
4036	268	252	245½	253½	126½	17	119	112½	35¼	35¼	42	18	126	119½	42¼	42¼	35
4037	275	257	252½	260½	126½	18	126	119½	42¼	42¼	35	18	126	119½	42¼	42¼	35

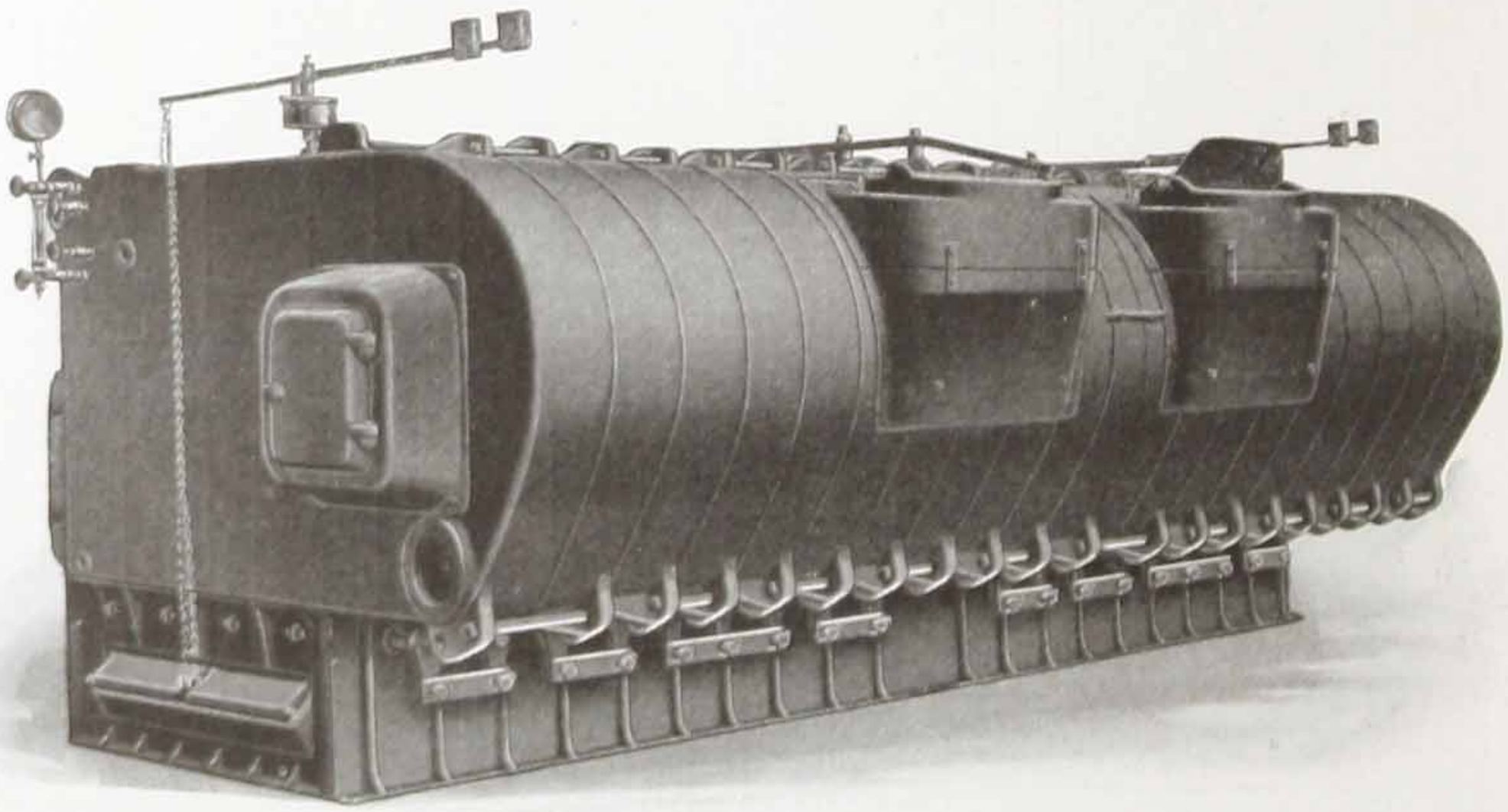
The measurements given above are based on the sections being drawn up to 7″ centers. Pipe measurements should be taken after boiler is erected as there may be a variance due to boiler sections not being drawn up exactly to 7″ centers.

See page 46 for plan view of single-series boilers showing elevation measurements.
See Page 53 for diagram showing position of tapped sections



Rear View of Single-Series Boiler showing rear smoke exit

The smoke exit in single-series boilers up to ten sections, unless otherwise ordered, is taken from the end. Either end may be used, the smoke hood and cleanout door frame being interchangeable. If desired the smoke exit may be taken from rear at one end as shown above. Smoke exit is taken from the rear in boilers having more than ten sections.



Rear view of Double-Series Boiler showing two rear smoke exits

Standard Assembly Position of Boiler Sections—Single Series

Number of Sections													Boiler No.		No. of Grates		Water Fronts					
12	11	10	9	8	7	6	5	4	3	2	1		Regular	Smoke-less	Plain	Shaking	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
							L	P	P	P	R		**25**		2	2		1				
						L	P	P	P	P	R		**26**		3	2			1			
					L	P	P	P	P	P	R		**27**		4	2				1		
				L	P	P	P	P	P	P	R		**28**		5	2					1	
							L	P	P	P	R		**35**	**530**	2	2		1				
						L	P	P	P	P	R		**36**	**630**	3	2			1			
					L	P	P	P	P	P	R		**37**	**730**	4	2				1		
				L	P	P	P	P	P	P	R		**38**	**830**	5	2					1	
			L	P	P	P	P	P	P	P	R		**39**	**930**	5	3	1	1				
		L	P	P	P	P	P	P	P	P	R		**310**	**1030**	5	4		2				
	L	P	P	P	P	P	P	P	W	W	R		**311**	**1130**	7	3	1			1		
L	P	P	P	P	P	P	P	P	W	W	R		**312**	**1230**	7	4			2			
						L	P	P	P	P	R		**46**	**640**	3	2			1			
					L	P	P	P	P	P	R		**47**	**740**	4	2				1		
				L	P	P	P	P	P	P	R		**48**	**840**	5	2					1	
			L	P	P	P	P	P	P	P	R		**49**	**940**	5	3	1	1				
		L	P	P	P	P	P	P	P	P	R		**410**	**1040**	5	4		2				
			L	P	P	P	P	P	W	W	R		**411**	**1140**	7	3	1			1		
				L	P	P	P	T	P	P	W	W	W	R	**412**	**1240**	7	4			2			
					L	P	P	P	P	T	P	H	W	W	W	R	**413**	**1340**	8	4			1			
						L	P	P	P	T	P	P	H	W	W	W	R	**414**	**1440**	9	4			2			
							L	P	P	T	P	P	H	W	W	W	R	**415**	**1540**	10	4			1		1	
								L	P	T	H	W	W	W	P	T	P	P	P	P	R	**416**	**1640**	11	4					2	
									L	P	T	H	W	W	W	P	T	P	P	P	P	R	**417**	**1740**	11	5					1	
										L	P	T	H	W	W	W	T	P	P	P	P	P	R	**418**	**1840**	11	6						2
18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																

Key to Letters

L—Left End Section. R—Right End Section. P—Plain Intermediate. W—Whole Cutout. H—Half Cutout. T—Tapped Intermediate.

Other than having a flow tapping, tapped sections are the same as plain intermediate and may be placed in any position, if standard assembly is not desired.

Cutout sections are also the same as plain intermediate sections excepting that they are cut out in rear to form rear smoke outlet. If standard assembly is not desired, the cutout sections may be placed so that smoke outlet is on left-hand end in rear or in center of rear.

Standard Assembly Position of Boiler Sections—Double Series
Regular and Smokeless

Double-series boiler numbers are the same for regular and smokeless. Order must specify kind desired

Left-hand part of double boiler																					Boiler	Right-hand part of double boiler																	
18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
													L	P	W	W	R		**3011**	L	W	W	P	R														
													L	P	W	W	R		**3012**	L	W	W	P	P	R													
												L	P	P	W	W	R		**3013**	L	W	W	P	P	R													
												L	P	P	W	W	R		**3014**	L	W	W	P	P	P	R												
											L	P	P	P	W	W	R		**3015**	L	W	W	P	P	P	R												
											L	P	P	P	W	W	R		**3016**	L	W	W	P	P	P	P	R											
										L	P	P	P	P	W	W	R		**3017**	L	W	W	P	P	P	P	R											
										L	P	P	P	P	W	W	R		**3018**	L	W	W	P	P	P	P	P	R										
									L	P	P	P	P	P	W	W	R		**3019**	L	W	W	P	P	P	P	P	R										
									L	P	P	P	P	P	W	W	R		**3020**	L	W	W	P	P	P	P	P	P	R									
								L	P	P	P	P	P	P	W	W	R		**3021**	L	W	W	P	P	P	P	P	P	R									
								L	P	P	P	P	P	P	W	W	R		**3022**	L	W	W	P	P	P	P	P	P	P	R								
							L	P	P	P	P	P	P	P	W	W	R		**3923**	L	W	W	P	P	P	P	P	P	P	R								
							L	P	P	P	P	P	P	P	W	W	R		**3024**	L	W	W	P	P	P	P	P	P	P	P	R							
					L	P	P	P	P	P	P	P	P	P	W	W	R		**3025**	L	W	W	P	P	P	P	P	P	P	P	R							

A double-series boiler consists of two single boilers set up on separate bases. The two boilers are set up seven inches apart. The 7″ space is covered by platework.

Other than having a flow tapping, tapped sections are the same as plain intermediate sections and may be placed in any position.

Cutout sections form the smoke outlet but otherwise are the same as plain intermediates.

If standard assembly position as shown is not desired, the position of the cutout sections may be changed so that smoke outlet will be on either end in the rear or in the center. Position of tapped intermediate sections may also be changed.

Key to Letters

L—Left End Section. R—Right End Section. P—Plain Intermediate. W—Whole Cutout. H—Half Cutout. T—Tapped.

Key to Boiler Numbers

First two numerals indicate the Series. The last two, the number of Sections, counting 7″ space between the right and left boiler as one section.

Standard Assembly Position of Boiler Sections—Double Series
Regular and Smokeless

Double-series boiler numbers are the same for regular and smokeless. Order must specify kind desired.

Left-hand part of double boiler																		Boiler	Right-hand part of double boiler																	
18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
												L	P	P	W	W	R	**4013**	L	W	W	P	P	R													
												L	P	P	W	W	R	**4014**	L	W	W	P	P	P	R												
											L	P	P	P	W	W	R	**4015**	L	W	W	P	P	P	R												
											L	P	P	P	W	W	R	**4016**	L	W	W	H	P	P	P	R											
										L	P	P	P	H	W	W	R	**4017**	L	W	W	H	P	P	P	R											
										L	P	P	P	H	W	W	R	**4018**	L	W	W	H	P	P	P	P	R										
									L	P	P	P	P	H	W	W	R	**4019**	L	W	W	H	P	P	P	P	R										
									L	P	P	P	P	H	W	W	R	**4020**	L	W	W	W	P	P	P	P	P	R									
								L	P	P	P	P	P	W	W	W	R	**4021**	L	W	W	W	P	P	P	P	P	R									
								L	P	P	P	P	P	W	W	W	R	**4022**	L	W	W	W	P	P	P	P	P	P	R								
							L	P	P	P	P	P	P	W	W	W	R	**4023**	L	W	W	W	P	P	P	P	P	P	R								
							L	P	P	P	P	P	P	W	W	W	R	**4024**	L	W	W	W	P	P	T	P	P	P	P	R							
						L	P	P	P	P	T	P	P	W	W	W	R	**4025**	L	W	W	W	P	P	T	P	P	P	P	R							
						L	P	P	P	P	T	P	P	W	W	W	R	**4026**	L	H	W	W	W	P	T	P	P	P	P	P	R						
					L	P	P	P	P	P	T	P	H	W	W	W	R	**4027**	L	H	W	W	W	P	T	P	P	P	P	P	R						
						L	P	P	P	P	P	T	P	H	W	W	W	R	**4028**	L	H	W	W	W	P	P	T	P	P	P	P	P	R				
					L	P	P	P	P	P	T	P	P	H	W	W	W	R	**4029**	L	H	W	W	W	P	P	T	P	P	P	P	P	R				
					L	P	P	P	P	P	T	P	P	H	W	W	W	R	**4030**	L	H	W	W	W	P	P	T	P	P	P	P	P	R				
				L	P	P	P	P	P	P	T	P	P	H	W	W	W	R	**4031**	L	H	W	W	W	P	P	T	P	P	P	P	P	P	R			
				L	P	P	P	P	T	H	W	W	W	P	P	P	P	R	**4032**	L	P	P	P	P	T	H	W	W	W	T	P	P	P	P	R			
			L	P	P	P	P	T	H	W	W	W	T	P	P	P	P	R	**4033**	L	P	P	P	P	T	H	W	W	W	T	P	P	P	P	R			
			L	P	P	P	P	T	H	W	W	W	T	P	P	P	P	R	**4034**	L	P	P	P	P	T	H	W	W	W	P	T	P	P	P	P	R		
		L	P	P	P	P	T	H	W	W	W	P	T	P	P	P	P	R	**4035**	L	P	P	P	P	T	H	W	W	W	P	T	P	P	P	P	R		
		L	P	P	P	P	T	H	W	W	W	P	T	P	P	P	P	R	**4036**	L	P	P	P	P	P	T	H	W	W	W	T	P	P	P	P	P	R	
	L	P	P	P	P	P	T	H	W	W	W	T	P	P	P	P	P	R	**4037**	L	P	P	P	P	P	T	H	W	W	W	T	P	P	P	P	P	R	
18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Key to Letters

L—Left End Section. R—Right End Section. P—Plain Intermediate. W—Whole Cutout. H—Half Cutout. T—Tapped.

Key to Boiler Numbers

First two numerals indicate the Series. The last two, the number of Sections, counting 7″ space between the right and left boiler as one section.

Radiator Warmth

A special committee in New York State, appointed to investigate heating and ventilating in public schools, after several years' investigation, report that excessive temperature is detrimental to health.

The healthful heating plant, then, is one which will maintain an even, healthful temperature at all times. This can best be accomplished with radiators, which can be so placed that the entire room is evenly and confortably warmed.

Heat is conveyed to the radiators through pipes with steam or water as the conductor. This sure and positive method of distribution is not affected by outside winds.

Hot air furnaces send blasts of hot, dust-laden air into the room, greatly overheating the space near the registers and often failing to reach other parts of the room. The air is heated by passing around the furnace fire pot which is often red hot, and its distribution is largely subject to the will of outside winds.

In choosing between radiator warmth and hot air heat, you choose between easily controlled, even and healthful warmth, which reaches every nook and corner, and alternating overheating and underheating.

The little tots playing on the floor, free from drafts, and grandmother sitting in her easy chair, comfortably warm, is a modern picture of contentment, made possible by radiator warmth.

Continental Radiators

Ample free air spaces
Correct interior circulation
Graceful lines and smooth castings
Pleasing to the eye and high in efficiency

Continental One-Column Radiator

One-Column Radiators

Made in 38 in. 32 in. 26 in. 20 in.

Width 4½ Inches — Width at Legs 5 Inches

No. of Sec.	†Length 2½ in. Per Sec.	Heating Surface			
		38 Inch 3 Sq. Ft. Per Sec.	32 Inch 2½ Sq. Ft. Per Sec.	26 Inch 2 Sq. Ft. Per Sec.	20 Inch 1½ Sq. Ft. Per Sec.
2	5	6	5	4	3
3	7½	9	7½	6	4½
4	10	12	10	8	6
5	12½	15	12½	10	7½
6	15	18	15	12	9
7	17½	21	17½	14	10½
8	20	24	20	16	12
9	22½	27	22½	18	13½
10	25	30	25	20	15
11	27½	33	27½	22	16½
12	30	36	30	24	18
13	32½	39	32½	26	19½
14	35	42	35	28	21
15	37½	45	37½	30	22½
16	40	48	40	32	24
17	42½	51	42½	34	25½
18	45	54	45	36	27
19	47½	57	47½	38	28½
20	50	60	50	40	30
21	52½	63	52½	42	31½
22	55	66	55	44	33
23	57½	69	57½	46	34½
24	60	72	60	48	36
25	62½	75	62½	50	37½
26	65	78	65	52	39
27	67½	81	67½	54	40½
28	70	84	70	56	42
29	72½	87	72½	58	43½
30	75	90	75	60	45
31	77½	93	77½	62	46½
32	80	96	80	64	48

Distance from floor to center of upper tappings — 35¾″ — 30¼″ — 23⅞″ — 18″

Distance from floor to center of bottom tappings, 4½″.

††Overall Height — 38″ — 32″ — 26″ — 20″

Radiators tapped 2″ and bushed to regular list sizes. No top tapping unless ordered.

†Allow ½″ for each bushing in estimating length of radiators.
††Fractions omitted.

Continental Two-Column Radiator

Two-Column Radiators

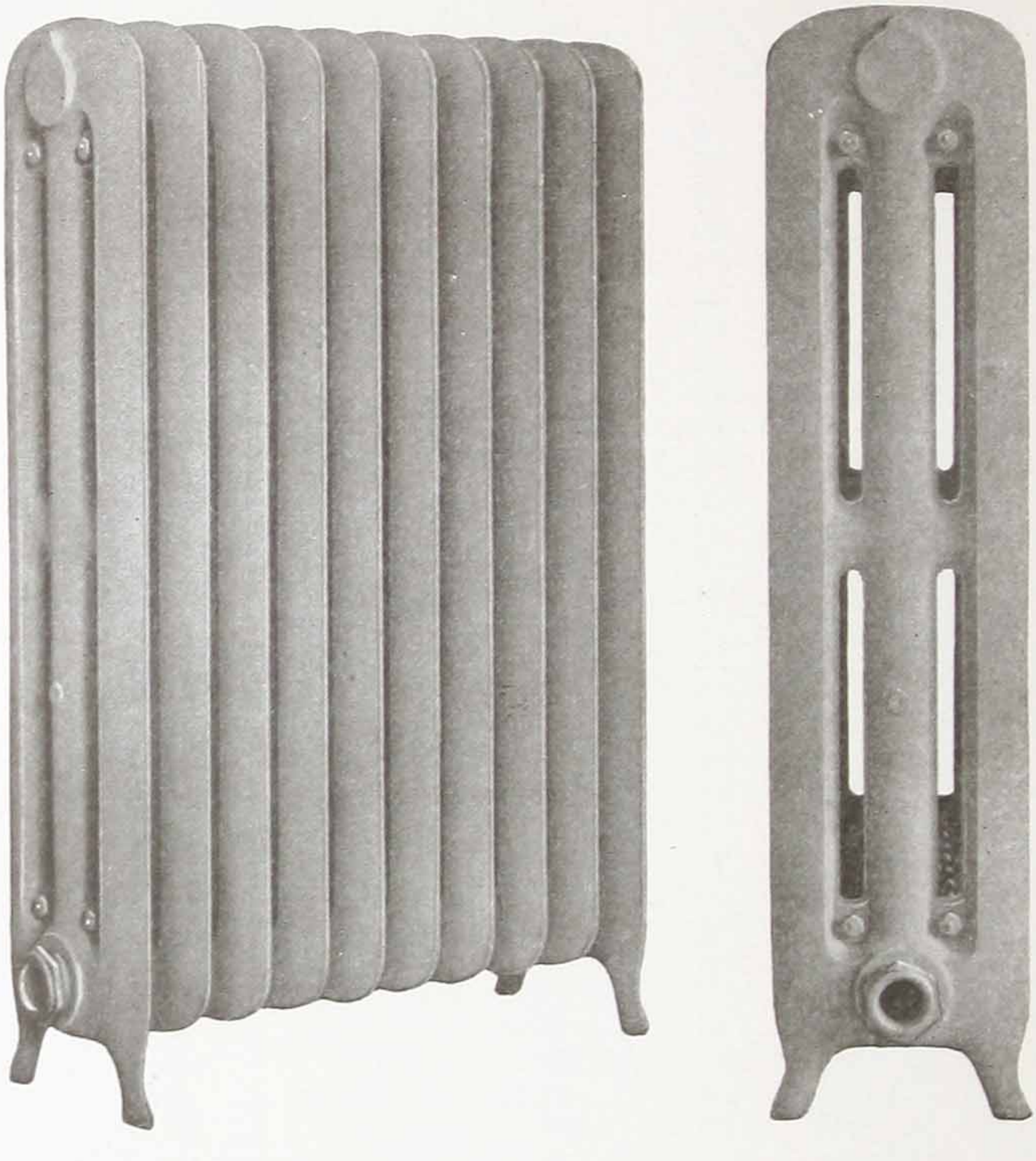
Made in 38 in. 32 in. 26 in. 23 in. 20 in.

Width 7⅛ Inches — Width at Legs 7⅛ Inches

No. of Sec.	†Length 2½ in. Per Sec.	Heating Surface				
		38 Inch 4 Sq. Ft. Per Sec.	32 Inch 3⅓ Sq. Ft. Per Sec.	26 Inch 2⅔ Sq. Ft. Per Sec.	23 Inch 2⅓ Sq. Ft. Per Sec.	20 Inch 2 Sq. Ft. Per Sec.
2	5	8	6⅔	5⅓	4⅔	4
3	7½	12	10	8	7	6
4	10	16	13⅓	10⅔	9⅓	8
5	12½	20	16⅔	13⅓	11⅔	10
6	15	24	20	16	14	12
7	17½	28	23⅓	18⅔	16⅓	14
8	20	32	26⅔	21⅓	18⅔	16
9	22½	36	30	24	21	18
10	25	40	33⅓	26⅔	23⅓	20
11	27½	44	36⅔	29⅓	25⅔	22
12	30	48	40	32	28	24
13	32½	52	43⅓	34⅔	30⅓	26
14	35	56	46⅔	37⅓	32⅔	28
15	37½	60	50	40	35	30
16	40	64	53⅓	42⅔	37⅓	32
17	42½	68	56⅔	45⅓	39⅔	34
18	45	72	60	48	42	36
19	47½	76	63⅓	50⅔	44⅓	38
20	50	80	66⅔	53⅓	46⅔	40
21	52½	84	70	56	49	42
22	55	88	73⅓	58⅔	51⅓	44
23	57½	92	76⅔	61⅓	53⅔	46
24	60	96	80	64	56	48
25	62½	100	83⅓	66⅔	58⅓	50
26	65	104	86⅔	69⅓	60⅔	52
27	67½	108	90	72	63	54
28	70	112	93⅓	74⅔	65⅓	56
29	72½	116	96⅔	77⅓	67⅔	58
30	75	120	100	80	70	60
31	77½	124	103⅓	82⅔	72⅓	62
32	80	128	106⅔	85⅓	74⅔	64
Distance from floor to center of upper tappings		35¼″	29″	23⅛″	20⅜″	17¼″
Distance from floor to center of bottom tappings, 4½″						
††Overall Height		38″	32″	26″	23″	20″

Radiators tapped 2″ and bushed to regular list sizes. No top tapping unless ordered.

†Allow ½″ for each bushing in estimating length of radiators.
††Fractions omitted.



Continental Three-Column Radiator

Three-Column Radiators

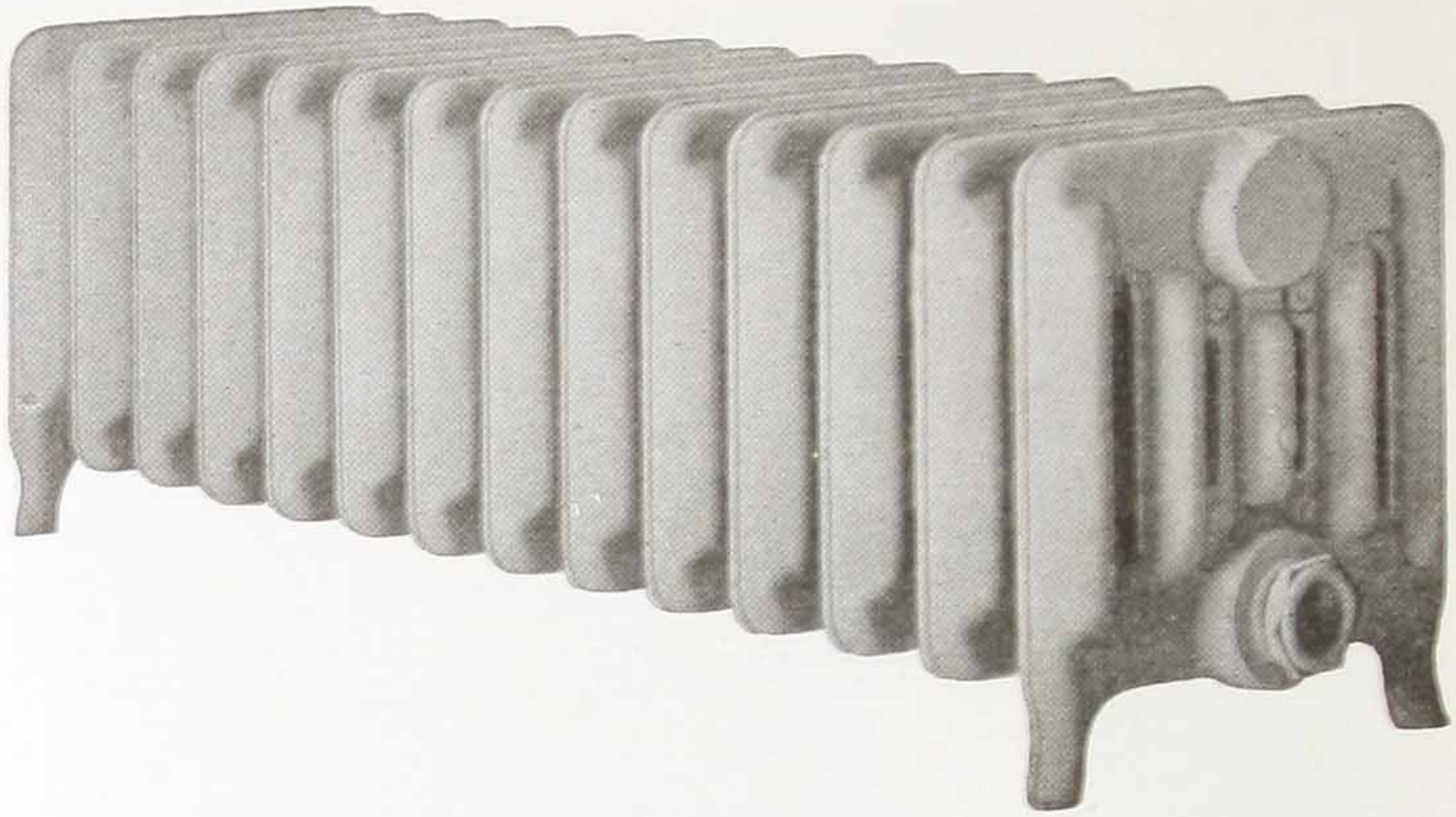
Made in 38 Inch, 32 Inch, 26 Inch, 22 Inch and 18 Inch.

Width 9 Inches — Width at Legs 9 Inches

No. of Sec.	†Length 2½ in. Per Sec.	Heating Surface				
		38 Inch 5 Sq. Ft. Per Sec.	32 Inch 4½ Sq. Ft. Per Sec.	26 Inch 3¾ Sq. Ft. Per Sec.	22 Inch 3 Sq. Ft. Per Sec.	18 Inch 2¼ Sq. Ft. Per Sec.
2	5	10	9	7½	6	4½
3	7½	15	13½	11¼	9	6¾
4	10	20	18	15	12	9
5	12½	25	22½	18¾	15	11¼
6	15	30	27	22½	18	13½
7	17½	35	31½	26¼	21	15¾
8	20	40	36	30	24	18
9	22½	45	40½	33¾	27	20¼
10	25	50	45	37½	30	22½
11	27½	55	49½	41¼	33	24¾
12	30	60	54	45	36	27
13	32½	65	58½	48¾	39	29¼
14	35	70	63	52½	42	31½
15	37½	75	67½	56¼	45	33¾
16	40	80	72	60	48	36
17	42½	85	76½	63¾	51	38¼
18	45	90	81	67½	54	40½
19	47½	95	85½	71¼	57	42¾
20	50	100	90	75	60	45
21	52½	105	94½	78¾	63	47¼
22	55	110	99	82½	66	49½
23	57½	115	103½	86¼	69	51¾
24	60	120	108	90	72	54
25	62½	125	112½	93¾	75	56¼
26	65	130	117	97½	78	58½
27	67½	135	121½	101¼	81	60¾
28	70	140	126	105	84	63
29	72½	145	130½	108¾	87	65¼
30	75	150	135	112½	90	67½
31	77½	155	139½	116¼	93	69¾
32	80	160	144	120	96	72
Distance from floor to center of upper tappings		35⅜″	29⅝″	23½″	19½″	15½″
Distance from floor to center of bottom tappings, 4½″.						
††Overall Height		38″	32″	26″	22″	18″

Radiators tapped 2″ and bushed to regular list sizes. No top tapping unless ordered.

†Allow ½″ for each bushing in estimating length of radiators.
††Fractions omitted.



Continental Five-Column Radiators

Five-Column Radiators

Made in 22 in. 18 in. 14 in.

Width 13⅛ Inches — Width at Legs 13⅛ Inches

No. of Sec.	†Length 3 in. Per Sec.	Heating Surface		
		22 Inch 6 Sq. Ft. Per Sec.	18 Inch 5 Sq. Ft. Per Sec.	14 Inch 4 Sq. Ft. Per Sec.
2	6	12	10	8
3	9	18	15	12
4	12	24	20	16
5	15	30	25	20
6	18	36	30	24
7	21	42	35	28
8	24	48	40	32
9	27	54	45	36
10	30	60	50	40
11	33	66	55	44
12	36	72	60	48
13	39	78	65	52
14	42	84	70	56
15	45	90	75	60
16	48	96	80	64
17	51	102	85	68
18	54	108	90	72
19	57	114	95	76
20	60	120	100	80
21	63	126	105	84
22	66	132	110	88
23	69	138	115	92
24	72	144	120	96
25	75	150	125	100
26	78	156	130	104
27	81	162	135	108
28	84	168	140	112
29	87	174	145	116
30	90	180	150	120
31	93	186	155	124
32	96	192	160	128

Distance from floor to center of upper tappings — 20″ — 16″ — 12″

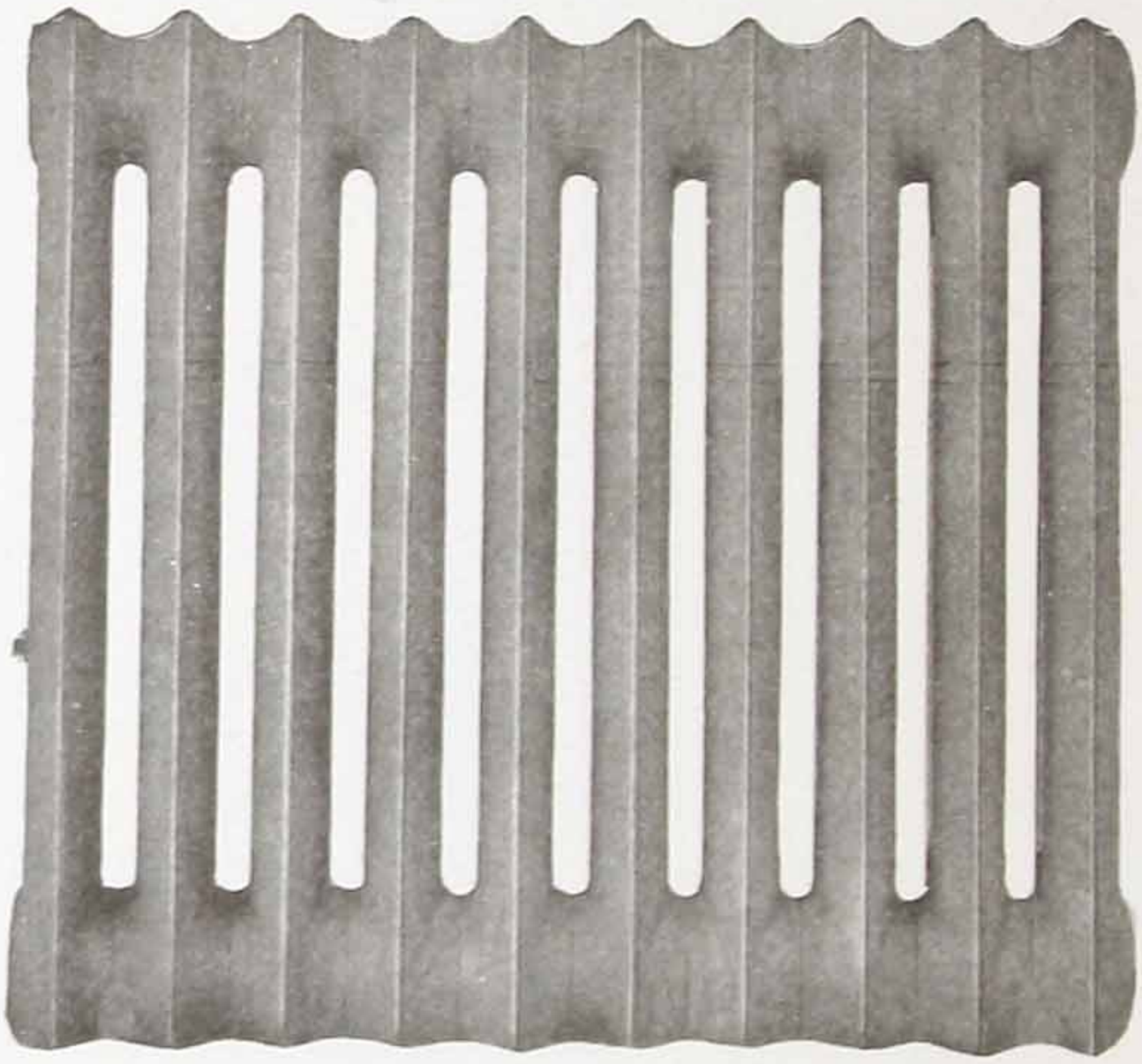
Distance from floor to center of bottom tappings, 3½″

††Overall Height, — 22″ — 18″ — 14″

Radiators tapped 2″ and bushed to regular list sizes. No top tapping unless ordered.

†Allow ½″ for each bushing in estimating length of radiators.
††Fractions omitted.

Wall Brackets



Continental Wall Radiators

One-Column Legless

Wall Radiators

One-Column Legless

One column without legs used as wall radiators
Width 4½ Inches

No. of Sec.	†Length 2½ in. Per Sec.	Heating Surface			
		38 Inch 3 Sq. Ft. Per Sec.	32 Inch 2½ Sq. Ft. Per Sec.	26 Inch 2 Sq. Ft. Per Sec.	20 Inch 1½ Sq. Ft. Per Sec.
2	5	6	5	4	3
3	7½	9	7½	6	4½
4	10	12	10	8	6
5	12½	15	12½	10	7½
6	15	18	15	12	9
7	17½	21	17½	14	10½
8	20	24	20	16	12
9	22½	27	22½	18	13½
10	25	30	25	20	15
11	27½	33	27½	22	16½
12	30	36	30	24	18
13	32½	39	32½	26	19½
14	35	42	35	28	21
15	37½	45	37½	30	22½
16	40	48	40	32	24
17	42½	51	42½	34	25½
18	45	54	45	36	27
19	47½	57	47½	38	28½
20	50	60	50	40	30
21	52½	63	52½	42	31½
22	55	66	55	44	33
23	57½	69	57½	46	34½
24	60	72	60	48	36
25	62½	75	62½	50	37½
26	65	78	65	52	39
27	67½	81	67½	54	40½
28	70	84	70	56	42
29	72½	87	72½	58	43½
30	75	90	75	60	45
31	77½	93	77½	62	46½
32	80	96	80	64	48

Distance from center to center of tappings				
	30⅞″	25½″	18¾″	12⅞″
Overall Height	35⅜″	29½″	23¼″	17⅜″

Radiators tapped 2″ and bushed to regular list sizes.

†Allow ½″ for each bushing in estimating length of radiators.

Tappings of Continental Radiators

Steam Radiators—One-Pipe Work—Supply

Up to 24 square feet, inclusive	1 -inch
Above 24, up to 60 square feet	1¼-inch
Above 60, up to 100 square feet	1½-inch
Above 100 square feet	2 -inch

Two-Pipe Work—Supply and Return

Up to 48 square feet, inclusive	1 x ¾-inch
Above 48, up to 96 square feet	1¼ x 1 -inch
Above 96 square feet	1½ x 1¼-inch

Water Radiators Tapped for Supply and Return

Up to 40 square feet, inclusive	1 x 1 -inch
Above 40, up to 72 square feet	1¼ x 1¼-inch
Above 72 square feet	1½ x 1½-inch

Air-Valve and Vapor Tappings

All air-valve tappings of Continental Radiators are regularly made ⅛″.

Vapor tappings, top and bottom opposite ends; supply, ¾″; return, ½″ eccentric.

Steam and water radiators are tapped two inches at bottom only and bushed to sizes shown above unless otherwise ordered.

Radiators are not tapped at top unless order clearly specifies top tappings.

Radiators of 19 sections to 35 sections have one center leg. Radiators of 36 sections to 52 sections have two center legs.

Continental Radiators are assembled with extra heavy malleable push nipples, making a permanent iron-to-iron joint. Paper or composition washers are never used. Push-nipple connections do not require washers or gaskets to make them tight as is the case with threaded or screw nipple connections.

Each individual section is rigidly tested and inspected. After being assembled every radiator is tested the second time.

Fuel

The quality of fuel to be used is an important factor in the selection of boiler capacity. Boiler ratings are based on the use of either hard or soft coal containing 13,000 B. T. U. (British Thermal Unit). One B. T. U. is the quantity of heat required to raise one pound of water one degree Fahrenheit. Coal varies in heat value as much as fifty percent.

If the rating of a boiler is based on the evaporation of nine pounds of water per pound of coal, and coal is used which only evaporates five pounds of water per pound of coal, it is evident that a greater number of pounds of coal will be required to produce the same amount of steam.

Since more coal is required, then a larger fire box will have to be provided or the firing period will have to be shortened. Unfortunately the quality of coal is not always known or easily determined. If there is any doubt regarding the quality of coal ordinarily obtainable in a certain locality, it is advisable to install an oversized boiler.

Continental Boilers are designed to burn either hard or soft coal. Because any part of the grate surface is readily accessible even very low grades of coal can be burned.

Oil and gas are successfully used as fuel in Continental Boilers in many sections of the country. Blueprints showing typical installations will be sent upon application.

Basis of Boiler Ratings

The rating of steam boilers is based upon a gauge pressure of 2 pounds at the boiler and the condensation of ¼ pound of steam per square foot of radiating surface standing in still air at 70°. This is equivalent to the transmission of 242.6 B. T. U. per hour.

The rating of water boilers is based upon water leaving the boiler at 180″ temperature and the transmission of 150 B. T. U.'s per square foot of radiating surface standing in still air at 70°.

The above are accepted factors for direct cast-iron radiation.

All other forms of radiating surface must be reduced to the equivalent of direct cast iron.

The square feet of surface in mains, branches and returns should be carefully determined and the condensation for steam or cooling effect for water expressed in equivalent of direct cast iron and added to direct radiation.

Guarantee and Coverings

CONTINENTAL Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. On account of the varying conditions surrounding their installation, we do not guarantee our boilers otherwise. All Continental Low Water Line boilers are made and marked in accordance with the A. S. M. E. Code.

Both on account of increased efficiency and greater economy, we recommend that all boilers be thoroughly protected by a substantial covering of asbestos. On page 69, tables will be found giving the amount of asbestos cement required to cover CONTINENTAL Boilers.

Good Chimney Flue Essential

The value of the flue depends on area and velocity. Velocity alone is no proof of good draft—there also must be sufficient area to carry the gases.

A poor draft means imperfect combustion and a waste of fuel, because a large portion of the value of the fuel forms into gas, and if the air supply is not sufficient *this gas will not burn, merely passing off with the smoke and being lost.* With such conditions more coal will be used and the boiler will fall short of its capacity.

The saving in fuel will soon pay for the rebuilding of a faulty chimney.

The chimney-top should run above the highest part of the roof and should not be less in height than shown in table.

The chimney should be so located with reference to any higher buildings nearby that wind-currents will not form eddies and force the air downward in the shaft.

The flue should run as nearly straight as possible from the base to the top outlet. The outlet must not be capped so that its area is less than the area of the flue. *The flue should have no other openings into it but the boiler smokepipe.* Sharp bends and offsets in the flue will often reduce the area and choke the draft. The flue must be free of any feature which prevents full area for the passage of smoke.

Chimneys should be set on inside walls if possible; if set on outside walls the chimney breast should extend inside the house in preference to extending outside. This for the reason that heat is necessary to produce velocity in the chimney, and so much heat is lost from the outside wall that chimneys so located are apt to have poor drafts.

If the flue is made of tile the joints must be well cemented or all space between the tile and brick-work filled in tightly. *There must be no open crevices into the flue where the sections meet—otherwise the draft is checked.*

If the flue is made of brick, the stack should have outside walls at least eight inches thick to insure safety. The inside joints should be well struck; each course should be well bedded and free from surplus mortar at the joints.

If there is a soot-pocket in the flue below the smokepipe opening, the cleanout door should always be tightly closed. If this soot-pocket has other openings in it—from fireplaces or other connections—these openings check the draft and prevent best heating results from the boiler.

The smokepipe should not extend into the flue beyond the inside surface of the flue, otherwise the end of the pipe cuts down the area of the flue.

The joints where the smokepipe fits the smoke hood of the boiler or where the pipe enters the chimney should be made tight with boiler putty or asbestos cement.

The importance of a tight chimney flue cannot be emphazised too strongly.

A boiler connected to a tight chimney flue, smooth inside and without offsets will often work satisfactorily, even though the chimney is smaller than called for by standard practice. On the other hand, a boiler connected to an over size, but leaky chimney, seldom gives satisfaction.

The smoke test is the best method of testing a chimney for leaks. Build a smudge or smoky fire at the base of the chimney and then place a board or cap tightly over the top. The smoke will come out where the flue leaks. If two flues are in one chimney, smoke may come out of the other flue, showing there is air and hence draft leakage from one to the other.

Minimum Chimney Flue Sizes and Heights Recommended for Low-Pressure Steam and Hot Water Boilers

(Fire Underwriters' Specifications approved by National Boiler and Radiator Manufacturers' Ass'n.) Area dimensions given are inside measurements of the masonry walls of the chimney.

BOILER CAPACITY		NUMBER OF HEATERS ATTACHED TO FLUE							
		1		2		3		4	
Hot Water Rating Sq. Ft.	Steam (Direct) Rating Sq. Ft.	Dimensions Inches	Height Feet	Heaters cross-connected forming a battery and attached to one flue opening					
				Dimensions Inches	Height Feet	Dimensions Inches	Height Feet	Dimensions Inches	Height Feet
To 700	To 450	8x12	35						
900	600	8x12	35						
1100	700	8x12	40						
1500	1000	12x12	35						
2500	1500	12x12	40	12x16	45	16x20	50	20x20	55
4000	2500	12x16	40	16x20	50	20x24	55	24x24	60
5800	3600	16x16	45	20x24	55	24x28	60	28x28	65
7300	4500	16x20	50	24x24	60	28x32	65	30x30	70
8700	5400	20x20	55	24x28	65	30x30	70	30x36	80
10000	6400	20x24	60	28x28	70	30x32	80	30x36	90
12000	7400	24x24	65	30x30	75	32x32	85	36x36	90
14000	8400	24x28	65	32x32	75	30x36	85	36x42	100
15000	9400	28x28	70	30x36	80	36x36	90	42x42	100
17000	10400	28x32	70	30x36	80	36x42	90	42x48	100
19000	11400	30x30	70	36x36	80	42x42	90	48x48	100

Where round tile flue lining is used in place of rectangular, the nearest corresponding area shall be taken.

Asbestos Cement Required to Cover Boilers 1¼ Inches Thick

Boiler No.	Pounds Cement	Boiler No.	Pounds Cement	Boiler No.	Pounds Cement
25	250	3022	1420	4022	1975
26	290	3023	1480	4023	2050
27	330	3024	1540	4024	2125
28	370	3025	1600	4025	2200
29	410	....	....	4026	2275
....	....	46	775	4027	2350
35	400	47	850	4028	2425
36	460	48	925	4029	2500
37	520	49	1000	4030	2575
38	580	410	1075	4031	2650
39	640	411	1150	4032	2725
310	700	412	1225	4033	2800
311	760	413	1300	4034	2875
312	820	414	1375	4035	2950
3011	760	415	1450	4036	3025
3012	820	416	1525	4037	3100
3013	880	4013	1300	....	....
3014	940	4014	1375	....	....
3015	1000	4015	1450	....	....
3016	1060	4016	1525	....	....
3017	1120	4017	1600	....	....
3018	1180	4018	1675	....	....
3019	1240	4019	1750	....	....
3020	1300	4020	1825	....	....
3021	1360	4021	1900	....	....

Estimating Radiation Requirements

A simple method for computing the amount of steam radiation required to heat a building is the following rule by Mills:—

1 sq. ft. radiation to 200 cubic feet of air (cubical contents divided by 200).

1 sq. ft. radiation to 20 sq. ft. exposed wall (net exposed wall divided by 20).

1 sq. ft. radiation to 2 sq. ft. glass surface (glass surface divided by 2).

It is common practice to add 60% to the radiation required for steam to determine the amount required for water.

The above rule is simple and quick but because of widely varying conditions is not accurate.

Heat Loss Method

The B. t. u. or heat loss method is the only proper way of computing the radiation required to heat a building. It takes into account the loss of heat through different kinds of building construction and the loss by infiltration. The heat loss is expressed in B. t. u. (British thermal unit.)

The following data is largely compiled from the American Society of Heating and Ventilating Engineers' Guide. We recommend the use of the guide as a reference book for heating contractors as well as engineers.

Constants for Heat Transmission

B. t. u.'s transmitted per square foot per hour per degree difference in temperature between inside and outside air.

Brick Walls

Wall Thickness Inches	Plain	Plastered One Side	Air Space and Plastered	Furred and Plastered
4	0.52	0.50		0.28
8½	0.37	0.36	0.25	0.23
13	0.29	0.28	0.21	0.20
17½	0.25	0.24	0.19	0.18
22	0.22	0.21	0.16	0.16
26½	0.19	0.18	0.14	

(Buffalo Forge Co.) For Concrete Walls add 20% to Above Values

Outside Walls of Frame Building—Lath and Plaster Inside

Outside Construction		Inside Partition—Ordinary Stud	
Clapboards 7–16″ thick	0.44	Lath and plaster, one side	0.60
Same with paper lining	0.31	Lath and plaster, both sides	0.34
Same with ¾″ sheathing	0.28	Sheet iron siding	1.20
Same with paper and ¾″ sheathing	0.23	Corrugated Iron siding	1.50

For Floor Surfaces

Single wooden floor, no plaster beneath joists	0.45
Same, lath and plaster beneath joists	0.26
Double wooden floor, no plaster beneath joists	0.31
Same, lath and plaster beneath joists	0.18

Concrete—see concrete walls.

Assume temperature of unheated floor space beneath the floor at one-half the difference in temperature between indoors and outdoors.

Floors Laid on the Ground

Cement or tile, no wood above	0.31
Cement or tile, wood floors above	0.10
Dirt, no floor whatever	0.20
Wood, single, laid near ground	0.10

Assume temperature of earth as plus 30° to 50° F.

For Glass Surface and Doors

Single windows	1.09
Double windows	0.46
Single skylight	1.16
Double skylight	0.48
Pine Doors, 1″	0.41
Pine Doors, 1½″	0.32
Pine Doors, 2″	0.27

With glass and skylight it is advisable to consider single thickness of glass. Double glass may not be installed although specified, or if installed may become broken and later replaced by single thickness. A constant for single glass extensively used is 1.2 as suggested by John R. Allen.

Air Changes per Hour Commonly Used in Various Types of Buildings

Space	Air Changes	Space	Air Changes
Halls, 1st Floor	2 to 3	Bath and Serving Rooms	2
Halls, 2nd Floor	1	Kitchen and Offices	1 to 2
Halls, Living Room	2 to 3	Drug Stores	2 to 3
Living Rooms	1 to 2	Clothing Stores	1
Living Rooms with fireplaces without damper	2 to 4	Churches and Assembly Rooms	1 to 2
Dining Rooms	1 to 2	Factories, Lofts, etc.	1 to 2
Sleeping Rooms	1	Public Garages	2 to 5

Approximately 0.02 B. t. u. is required to heat 1 cu. ft. of air 1 deg. at 0 deg. Fahr. Therefore, in order to obtain the loss due to infiltration, multiply the cubical contents of the room by the difference in temperature between the inside and outside (for which the system is designed), then by 0.02 and then by number of air changes per hour.

Instead of assuming a certain number of air changes as a basis for estimating infiltration losses, many engineers use the lineal feet of window and outside door cracks, thereby avoiding errors where the glass area is large or small in proportion to the cubical contents. Where the glass and door area is small in proportion to the cubical contents the loss should be checked with the air change method, so that a minimum equivalent to one air change is allowed. This is necessary in order that sufficient heat will be available to bring the room quickly up to temperature after it has been cooled down.

Approximate Heat Loss Through Windows by Infiltration

Construction	B. t. u. per hr. per ft. of crack
Poor ($\frac{1}{16}$″ sash clearance)	2.4
Good ($\frac{1}{32}$″ sash clearance)	1.2
Weather stripped sash	0.6

By this method the loss due to infiltration will be, for good construction, 1.2 times the specified temperature difference between the outside and inside (usually 70) times the total number of lineal feet of crack. As the leakage of air occurs on the windward side of the building or room and the warm air leaves on the leeward side, *the total lineal feet of sash and door crack existing in the one outside wall having the maximum glass and door area should be taken only, instead of the total in the room.*

How to Compute Heat Loss

Multiply the net area of exposed wall (wall less glass) by constant shown in table for various kinds of walls and then by temperature differences. Add 10% if exposed to prevailing winds.

Multiply the total glass surface by 1.2 and then by temperature difference.

Multiply the total door surface by constant shown in table and then by temperature difference.

Multiply the cubical contents by .02, by temperature difference and then by number of air changes.

The total will be the B. t. u. loss. Divide the total B. t. u. by 250 to obtain amount of steam radiation. Divide the total B. t. u. by 150 to obtain amount of water radiation. (One square foot of steam radiation will give off approximately 250 B. t. u. See A. S. H. & V. E. Engineers' Guide for heat emitted by various column radiators.)

Add to Radiation for Intermittent Heating

Ten per cent if heated daytime only, and the location of the building is not exposed.

Twenty per cent when the building is heated daytime only, and the location of the building is exposed.

Thirty per cent when the building is heated intermittently with long intervals of non-heating.

Example of Use of Data in Determining Heat Losses

Assume a living room 15 x 15 ft. with a 10 ft. ceiling. The space below the room is heated while an unheated space exists above the ceiling. The room is exposed on the north and west and each of these walls has a single window 3 x 6 ft. The walls are frame construction with 7/16 in. clapboards, paper and 3/4 in. sheathing lathed and plastered on the inside. The ceiling is lath and plaster only. It is desired to heat the room to 70 deg. Fahr. in zero weather, one air change assumed, as there are no outside doors. The calculations, on basis of infiltration by air change method, would be as follows:

Cubical Contents	10 x 15 x 15	=	2250 cu. ft.
Window Area	3 x 6 x 2	=	36 sq. ft.
Net Wall Area	(10 x 15 x 2) — 36	=	264 sq. ft.
Ceiling Area	15 x 15	=	225 sq. ft.
Infiltration	2250 x 0.02 x 70	=	3150 B. t. u.
Net Exposed Wall	264 x 0.23 x 70	=	4180 B. t. u.
Plus 10% for northern exposure		=	418 B. t. u.
Windows	36 x 1.2 x 70	=	3024 B. t. u.
Ceiling	225 x 0.6 x 35	=	4725 B. t. u.
			15497 B. t. u.

15,497 B. t. u. ÷ 250=62 sq. ft. steam radiation.

If the infiltration had been estimated by the lineal feet of window crack, assuming poor construction, the loss would have been:

Ft. of crack of one window (3 x 3) + (6 x 2) = 21 ft. Infiltration— 21 x 2.4 x 70 = 3528 B. t. u., while for good construction the loss due to infiltration would have been 24 x 1.2 x 70 = 1714 B. t. u.

Greenhouse Heating

Table of Amounts of Steam and Water Radiating Surface Necessary to Heat a Given Amount of Glass Exposure to Various Temperatures of Zero Weather

Square Feet of Glass Exposure	HOT WATER				
	Number of Square Feet of Radiation Required at				
	40°	45°	50°	60°	70°
25	4 1–6	5	6 1–4	7 1–7	1–3
50	8	10	13	14	16
75	13	15	19	21	25
100	17	20	25	2.	33
200	33	40	50	57	67
300	50	60	75	86	100
400	67	80	100	114	133
500	83	100	125	143	167
1,000	167	200	250	286	333
2,000	333	400	500	572	667
3,000	500	600	750	857	1000
4,000	667	800	1000	143	1333
5,000	833	1000	1250	1429	1667
10,000	1667	2000	2500	1857	3333
20,000	3333	4000	5000	25714	6667

Square Feet of Glass Exposure	STEAM				
	Number of Square Feet of Radiation Required at				
	40°	45°	50°	60°	70°
25	2 7–9	3 1–8	3 4–7	4 1–6	5
50	5 5–9	6 1–4	7 1–7	8 1–3	10
75	8	9	10	13	15
100	11	13	14	17	20
200	23	25	30	33	40
300	34	38	43	50	60
400	45	50	57	67	80
500	56	63	72	83	100
1,000	112	125	143	167	200
2,000	223	250	286	333	400
3,000	334	375	429	500	600
4,000	445	500	571	667	800
5,000	556	625	714	833	1000
10,000	1112	1250	1429	1667	2000
20,000	2223	2500	2857	3333	4000

The above is for well built houses with closely fitted sash. If poorly built or with loose sash, add 1½ to 12½ per cent to the above.

Domestic Water Heating

When a pipe coil or cast-iron section is introduced into fire pot of a CONTINENTAL Boiler to heat water for domestic use, additional capacity should be provided—viz.: Based on temperature rise of 45° F. per hour additional tax is imposed as follows:

STEAM BOILER—1½ sq. ft. direct radiation per gallon of water heated.
WATER BOILER—2½ sq. ft. direct radiation per gallon of water heated.

Due consideration being given to capacity of storage tank used.

The use of coils is not recommended, because the demand for hot water for domestic use is independent of weather conditions. The heating power of coils varies with conditions of fire in the boiler, being greatest in winter when firing is at maximum and least in mild weather when fire runs low. A coil in the fire pot interferes with firing. Excelso and Taco types of heaters are superior to coils in steam boilers. A separate tank heater will supply hot water the year around at a small fuel cost.

Pipe Sizes for Gravity Hot-Water Heating

(From A. S. H. & V. E. Engineers' Guide)

Two-Pipe Hot-Water Basement Mains—Gravity Circulation

Direct Radiator Tappings

First Floor	Second Floor	Third Floor	Fourth Floor	Pipe Size, Inches
40	50	60	70	¾
70	80	90	100	1
110	120	135	150	1¼
180	195	210	230	1½
300	350	400	500	2

At ends of mains increase tapping one size. No main to be less than 1¼″.

To get size of mains and risers serving more than one radiator, add area of tappings together and use the following:

Equalizing Table

Inches			Inches		
½	equals	2	3	equals	175
¾	equals	5	3½	equals	260
1	equals	10	4	equals	380
1¼	equals	20	5	equals	650
1½	equals	30	6	equals	1,050
2	equals	60	7	equals	1,600
2½	equals	110	8	equals	2,250

To get size pipe to serve three ¾″ pipes and four 1″ pipes:

3—¾″ equal—15 (3 x 5)
4—1″ equal—40 (4 x 10)

55 equals 2″ (60 being nearest to 55)

Expansion tanks are made 1 gal. to 30 sq. ft., radiation up to 1,000 sq. ft.; 1 gal. to 40 sq. ft., 1,000 to 2,000 sq. ft.; 1 gal. to 50 sq. ft., 2,000 to 5,000 sq. ft.; and 1 gal. to 60 sq. ft. for jobs above 5,000 sq. ft. in radiators.

300 feet of radiation would require a 10-gal. expansion tank (300 divided by 30 equals 10).

Table Showing Expansion of Wrought-Iron Pipe

Initial Temperature	INCREASE IN LENGTH PER 100 FT. WHEN HEATED TO									
	160°	180°	200°	212°	228°	240°	250°	259°	267°	274°
Zero, in.	1.28	1.44	1.60	1.69	1.82	1.92	2.00	2.07	2.13	2.20
32° in.	1.02	1.18	1.34	1.43	1.56	1.66	1.74	1.81	1.87	1.94
64° in.	0.77	0.93	1.09	1.18	1.31	1.41	1.49	1.56	1.61	1.69
	Hot Water			Water Boils	5 lb.	10 lb.	15 lb.	20 lb.	25 lb.	30 lb.

Wrought-iron pipe expands in inches per 100 ft., 4-5 of the increase in temperature of steam or water it is subjected to, over the temperature at the time of installation, divided by 100.
Example — Temperature when installed, 32°, 10-lb. pressure = 240°, difference 208°, 4-5 of which equals 1.66 in. expansion per 100 ft.

Table of Mains and Branches

Main			Branch							
1	in.	will supply	2						¾	in.
1¼	in.	" "	2						1	in.
1½	in.	" "	2						1¼	in.
2	in.	" "	2						1½	in.
2½	in.	" "	2—1½	in. and	1—1¼	in. or	1—2	in. and	1—1¼	in.
3	in.	" "	1—2½	in. and	1—2	in. or	2—2	in. and	1—1½	in.
3½	in.	" "	2—2½	in. or	1—3	in. and	1—2	in. or	3—2	in.
4	in.	" "	1—3½	in. and	1—2½	in. or	2—3	in. and	4—2	in.
4½	in.	" "	1—3½	in. and	1—3	in. or	1—4	in. and	1—2½	in.
5	in.	" "	1—4	in. and	1—3	in. or	1—4½	in. and	1—2½	in.
6	in.	" "	2—4	in. and	1—3	in. or	4—3	in. or	10—2	in.
7	in.	" "	1—6	in. and	1—4	in. or	3—4	in. and	1—2	in.
8	in.	" "	2—6	in. and	1—5	in. or	5—4	in. and	2—2	in.

Table for Proportioning Single Pipe Steam Mains

Square Feet Radiation	TOTAL LENGTH OF MAIN IN FEET						
	20	40	75	100	150	200	Return
	Diam., Inches	Diam., Inches	Diam., Inches	Diam., Inches	Diam., Inches	Diam., Inches	Diam., Inches
100	1½	1½	1½	1½	1½	2	1
200	1½	1½	2	2	2	2	1¼
300	2	2	2	2	2	2½	1¼
400	2	2	2½	2½	2½	2½	1¼
500	2½	2½	2½	3	3	3	1¼
600	2½	3	3	3	3	3½	1½
700	2½	3	3	3	3½	3½	1½
800	3	3	3	3	3½	3½	1½
1000	3	3½	3½	3½	3½	4	2
1200	3½	4	4	4	4	4	2
1400	3½	4	4	4	4	5	2
1600	4	4	4	5	5	5	2½
1800	4	5	5	5	5	5	3
2000	4	5	5	5	5	5	3
2500	5	5	5	5	6	6	3
3000	5	5	6	6	6	6	3
3500	5	6	6	6	6	7	3
4000	6	6	6	7	7	7	3½
5000	7	7	7	8	8	8	4
6500	8	8	8	9	9	9	5

Reduce all radiating surface to equivalent in direct surface.

Square Feet of Radiating Surface of Pipe per Lineal Foot

On all lengths over one foot, fractions less than tenths are added to or dropped.

Length of Pipe in ft.	Size of Pipe									
	¾	1	1¼	1½	2	2½	3	4	5	6
1	.275	.346	.434	.494	.622	.753	.916	1.175	1.455	1.739
2	.5	.7	.9	1.	1.2	1.5	1.8	2.4	2.9	3.5
3	.8	1.	1.3	1.5	1.9	2.3	2.7	3.5	4.4	5.2
4	1.1	1.4	1.7	2.	2.5	3.	3.6	4.7	5.8	7.
5	1.4	1.7	2.2	2.4	3.1	3.8	4.6	5.8	7.3	7.7
6	1.6	2.1	2.6	2.9	3.7	4.5	5.5	7.	8.7	10.5
7	1.9	2.4	3.	3.4	4.4	5.3	6.4	8.2	10.2	12.1
8	2.2	2.8	3.5	3.9	5.	6.	7.3	9.4	11.6	13.9
9	2.5	3.1	3.9	4.4	5.6	6.8	8.2	10.6	13.1	15.7
10	2.7	3.5	4.3	4.9	6.2	7.5	9.1	11.8	14.6	17.4
11	3.	3.8	4.8	5.4	6.8	8.3	10.	12.9	16.	19.1
12	3.3	4.1	5.2	5.9	7.5	9.	11.	14.1	17.4	20.9
13	3.6	4.5	5.6	6.4	8.1	9.8	11.9	15.3	18.9	22.6
14	3.8	4.8	6.1	6.9	8.7	10.5	12.8	16.5	20.3	24.3
15	4.1	5.2	6.5	7.4	9.3	11.3	13.7	17.6	21.8	26.1
16	4.4	5.5	6.9	7.9	10.	12.	14.6	18.8	23.2	27.8
17	4.7	5.9	7.4	8.4	10.6	12.8	15.5	20.	24.7	29.5
18	5.	6.2	7.8	8.9	11.2	13.5	16.5	21.2	26.2	31.3
19	5.2	6.6	8.3	9.4	11.8	14.3	17.4	22.3	27.6	33.1
20	5.5	6.9	8.7	9.9	12.5	15.	18.3	23.5	29.1	34.8
25	6.9	8.6	10.9	12.3	15.6	18.8	22.9	29.3	36.3	43.5
30	8.3	10.4	13.	14.8	18.7	22.5	27.5	35.3	43.6	52.1
35	9.6	12.1	15.2	17.3	21.8	26.3	32.	41.1	50.9	60.8
40	11.	13.8	17.4	19.8	24.9	30.1	36.6	47.	58.2	69.5
45	12.4	15.6	19.5	22.2	28.	33.8	41.2	52.9	65.5	78.2
50	13.8	17.3	21.7	24.7	31.1	37.6	45.8	58.7	72.7	87.
55	15.2	19.0	23.9	27.1	34.3	41.3	50.4	64.6	80.1	95.6
60	16.6	20.8	26.0	29.6	37.3	45.2	55.	70.5	87.3	104.3
65	18.0	22.6	28.2	32.1	40.5	48.8	59.5	76.4	94.5	112.9
70	19.4	24.2	30.4	34.6	43.5	52.7	64.1	82.3	101.9	121.7
75	20.7	26.0	32.6	37.1	46.6	56.5	68.7	88.1	109.1	130.4
80	22.	27.7	34.7	39.6	49.8	60.2	73.3	94.0	116.4	139.1
85	23.4	29.4	36.9	42.0	53.4	63.9	77.8	99.9	123.7	147.9
90	24.8	31.1	39.1	44.5	56.	67.8	82.4	105.8	130.9	156.5
95	26.2	32.9	41.2	46.9	59.6	71.5	87.2	111.6	138.2	165.2
100	27.5	34.6	43.4	49.4	62.2	75.3	91.6	117.5	145.5	173.9

Note—Above information is quoted from standard authorities. Not guaranteed.

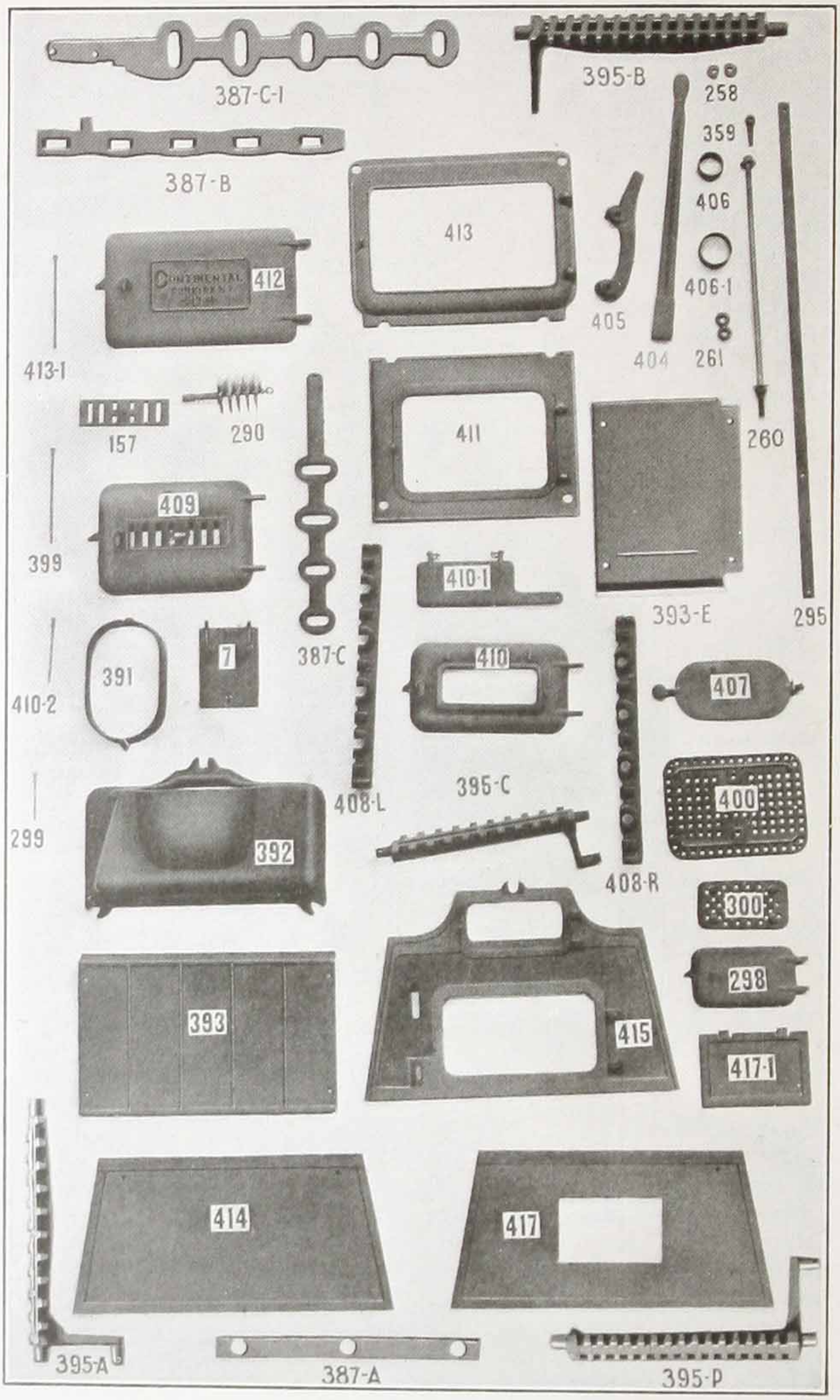
Price List Continental Boilers

With 13″ Grate

No. of Part	Article	List Price
6	Cold Air Check Frame for smoke box	$ .60
7	Cold Air Check Lid for smoke box	.50
122	Cold Air Check Lid for base side	.50
157	Ash Pit and Fire Door Slide, each	.30
258	Smallest size Cast Washer, per set of eight	.30
266	Cold Air Check Frame for base side	.75
268	Thumbscrew for seg. gauge on smoke box	.20
274	Damper Regulator Pipe	.50
275	Diaphragm Lever	.60
286	Ash Pit and Fire Door Slide Knob	.20
289	Scraper	1.00
290	Flue Brush	1.00
292	Number Plate	.20
293	Diaphragm Weight	1.00
294	Diaphragm	3.00
298	Clinker Door	.60
300	Clinker Door Liner	.30
301	Water Column	3.00
359	Clinker Door Catch	.20
360	Clinker Door Handle	.20
398	Damper Handle	.20
400	Fire Door Liner	.50
402	Door Handle	.20
403	Shaker Fulcrum	.50
406	2″ Push Nipple	.50
409	Fire Door	1.00
410	Ash Pit Door	1.00
416	Base Front	2.00
417	Base Back	1.50
418	Fire and Flue Door Frame	1.50
419	Short Connecting Bar	.40
420	Shaker Handle	.50
421	Smoke Box Damper	.40
422	Shaker Shank	.50
423	Seg. Gauge for smoke box damper	.50
424	Long Connecting Bar, per hole	.20
425	Flue Door	1.50
426	Smoke Box	3.00
427	Base Side Blank, per Section	.50
428	Base Side with Cold Air Check Hole, per Section	.50
429	Flue Door Liner	.50
430	Middle Grate	1.50
431	Grate Rest, per Section	.20
432	Damper Connection	.20
433	Hinge Pin, 5½″ long	.10
	Front Section	18.00
	Back Section	18.00
	Middle Section	15.00
	Tap Section	15.00
	Smoke Box Collar	.50
	Baffle Plate Front Frame Lining	.50

List Price Contento Boiler Parts

	List Price
Front Section	$20.00
Back Section	25.00
Intermediate Section	16.00
Tap Section	16.00
Ash Pit Door	2.50
Ash Pit Wheel Draft Check	.20
Ash Pit Draft Weighted Lever	.15
Ash Pit Plate—Four Section	1.60
Ash Pit Plate—Five Section	2.00
Ash Pit Plate—Six Section	2.40
Ash Pit Plate—Seven Section	2.80
Ash Pit Door Hinge	.20
Boiler Number Plate	.10
Coil Plates	.10
Fire Door	1.00
Fire Door Hinge Pin	.10
Fire Door Frame	1.00
Fire Door Slide	.15
Fire Door Liner	.65
Fire Door Hinge	.20
Flue Door	1.20
Flue Door Hinge	.20
Flue Foor Hinge Pin	.10
Grate Hanger	1.00
Grate Gears	.25
Grate Shaking and plain—Four Section Boiler, each	1.80
Grate Shaking and plain—Five Section Boiler, each	2.00
Grate Shaking and plain—Six Section Boiler, each	2.20
Grate Shaking and plain—Seven Section Boiler, each	2.40
Shaker Handle	.50
Smoke Box	1.00
Smoke Box Damper	.25
Smoke Pipe Check Frame	.75
Smoke Pipe Wheel Check Draft	.20
Smoke Pipe Check Weighted Lever	.15
Draw-up Bolts each per Section	.10
Top Nipple	.20
Bottom Nipple	.20
Ash Pit Door Knob	.15
Fire Door Knob	.15
Flue Door Knob	.15
Flue Door Catches per set	.10
Poker	.50
Flue Brush	.75
Flue Brush Handle	.25
Ash Pan—per Boiler Section	.25
2 x ¼″ Bushing	.10
5/16 x 1¾″ Bolts (two for fire door lining)	.10
¼ x ¾″ Bolts (three to attach fire door frame) each	.05
(two to attach flue door hinge)	.....
(two to attach grate hanger)	.....
3/16 x 1½″ Cotters (for grate gears)	.03



Continental Repair Parts

17-Inch Boilers

Price List of Repairs Continental Boilers

With 17" Grate

No. of Part	Made 1909 to Date, Inclusive	List Price
7	Smoke Box Check Lid	$ .30
157	Fire Door Slide	.20
258	C. I. Boiler Washer, per set of nine	.40
259	Boiler Washer Bolt, per set of nine	.50
260	Boiler Connecting Rod, per Section	.20
261	Rubber Washer	.10
286	Coilplate, per set of two	.10
287	Poker	1.00
288	Scraper Handle	.80
289	Scraper	.30
290	Flue Brush	1.00
291	Flue Brush Handle	.80
292	Number Plate	.20
293	Diaphragm Weight	1.00
295	Diaphragm Rod	.60
298	Clinker Door	.50
299	Clinker Door Hinge Pin	.10
300	Clinker Door Liner	.30
359	Base Back Clinker Hole Cover Catch	.20
	Short Connecting Link (old style)	.20
387-A	Long Connecting Bar, per hole (used with grate 395-A and 395-P)	.20
387-B	Long Connecting Bar, per hole (used with grate 395-B)	.30
387-C	Long Connecting Bar, per hole (used with grate 395-C)	.30
387-C1	Long Connecting Bar, per hole (used with grate 395-C)	.30
391	Smoke Box Collar	.60
392	Smoke Box	4.50
393	Base Side, per Section	.80
393-E	Base Side Extension	.80
395-A	Grate Bar (used with con. bar 387-A)	2.00
395-P	Grate Bar, Pea Coal (used with 387-A)	2.00
395-B	Grate Bar (used with con. bar 387-B)	2.00
395-C	Grate Bar (used with con. bar 387-C and 387-C1)	2.00
399	Fire Door Hinge Pin	.10
400	Fire Door Liner	.90
402	Fire Door Slide Handle	.10
404	Shaker Handle	.80
405	Shaker Shank	.60
406	Bottom Nipple	.50
406-1	Top Nipple	.50
407	Smoke Box Damper	.40
407-1	Smoke Box Damper Spring	.10
408-R	Right Hand Grate Rest, per Section	.25
408-L	Left Hand Grate Rest, per Section	.25
409	Fire Door	1.40
410	Ash Pit Door	1.00
410-1	Ash Pit Door Cover	.40
410-2	Ash Pit Door Hinge Pin	.10
411	Fire Door Frame	1.80
412	Flue Door	1.75
413	Flue Door Frame	1.80
413-1	Flue Door Hinge Pin	.10
414	Base Back	3.75
415	Base Front	3.80
417	Base Back with Clinker Hole	3.75
417-1	Base Back Clinker Hole Cover	.50
	Front Section	30.00
	Back Section	30.00
	Middle Section	22.00
	Tap Section	22.00

NOTE—When ordering repairs, give serial number of boiler. This is on small brass plate riveted to top of flue door. See illustrations of parts on opposite page.

List Price of Parts Necessary to Increase Continental Low Water Line Boilers

Boiler No.	To Increase One Section	To Increase Two Sections	To Increase Three Sections	To Increase Four Sections
35	$131.40	$207.45	$288.10	$324.90
36	129.30	207.45	287.15	323.40
37	140.45	218.85	295.40	323.40
38	133.80	225.10	300.25	322.10
39	113.65	210.15	286.45	
310	133.95	206.95		
311	123.70			
46	166.30	281.00	397.45	469.40
47	176.95	291.80	404.90	469.40
48	170.30	298.00	415.30	459.90
49	151.65	283.15	406.20	574.15
410	172.10	279.70	489.90	562.15
411	152.85	274.40	384.00	479.25
412	169.00	283.00	394.40	544.00
413	169.00	284.00	394.40	567.95
414	180.15	292.70	464.50	504.60
415	179.85	293.20	435.55	
416	170.85	338.80		

In addition to trade discount for repairs shown on current discount sheet, a special discount of 10% is allowed beyond above list prices. For price of parts to increase smokeless boilers add $6.00 per boiler section to above total list prices.

Continental Boilers can be increased in size by simply removing one end section and adding one or more intermediate sections. The position of the original intermediate sections need not be changed.

Continental Low Water Line Boilers

List Price Repair Parts

Key letters in left hand margin correspond to letters on the photograph of parts, page 85. Do not confuse key letters with pattern numbers which are cast on the parts. Always give size of boiler when ordering repairs.

	Name of Part	20″	30″	40″
	Left End Section	$43.00	$80.00	$128.00
	Right End Section	43.00	80.00	128.00
	Intermediate Section	32.00	54.00	88.00
	Whole Cutout Section		54.00	88.00
	Half Cutout Section			88.00
	Tapped Section		54.00	88.00
	No. 4 Front Section	16.00	16.00	16.00
	No. 5 Front Section	20.00	20.00	20.00
	No. 6 Front Section	24.00	24.00	24.00
	No. 7 Front Section	28.00	28.00	28.00
	No. 8 Front Section	32.00	32.00	32.00
	No. 9 Front Section	36.00	36.00	36.00
	No. 4 Box	36.00	36.00	36.00
	No. 5 Box	45.00	45.00	45.00
	No. 6 Box	54.00	54.00	54.00
	No. 7 Box	63.00	63.00	63.00
	End Box, End Flue	38.00	54.00	77.00
	End Box, Rear Flue		54.00	77.00
	Double-Series Connecting Box		10.00	11.00
	Connecting Box (per Boiler Section)	3.50	4.00	4.50
	Grates, Plain	5.00	7.50	10.00
	Grates, Shaking	5.00	7.50	10.00
	Fire Tools	5.00	5.00	7.00
	Steam Box (without safety valve)	30.00	30.00	30.00
a	Smokeless Air Jet (left end 40″ boilers only)			2.00
b	Smokeless Air Jet (Intermediate 30″ and 40″ boilers)		5.00	5.00
c	Smokeless Air Jet (right end 30″ and 40″ boilers)		5.00	5.00
ab	Smokeless Air Cup, each		.50	.50

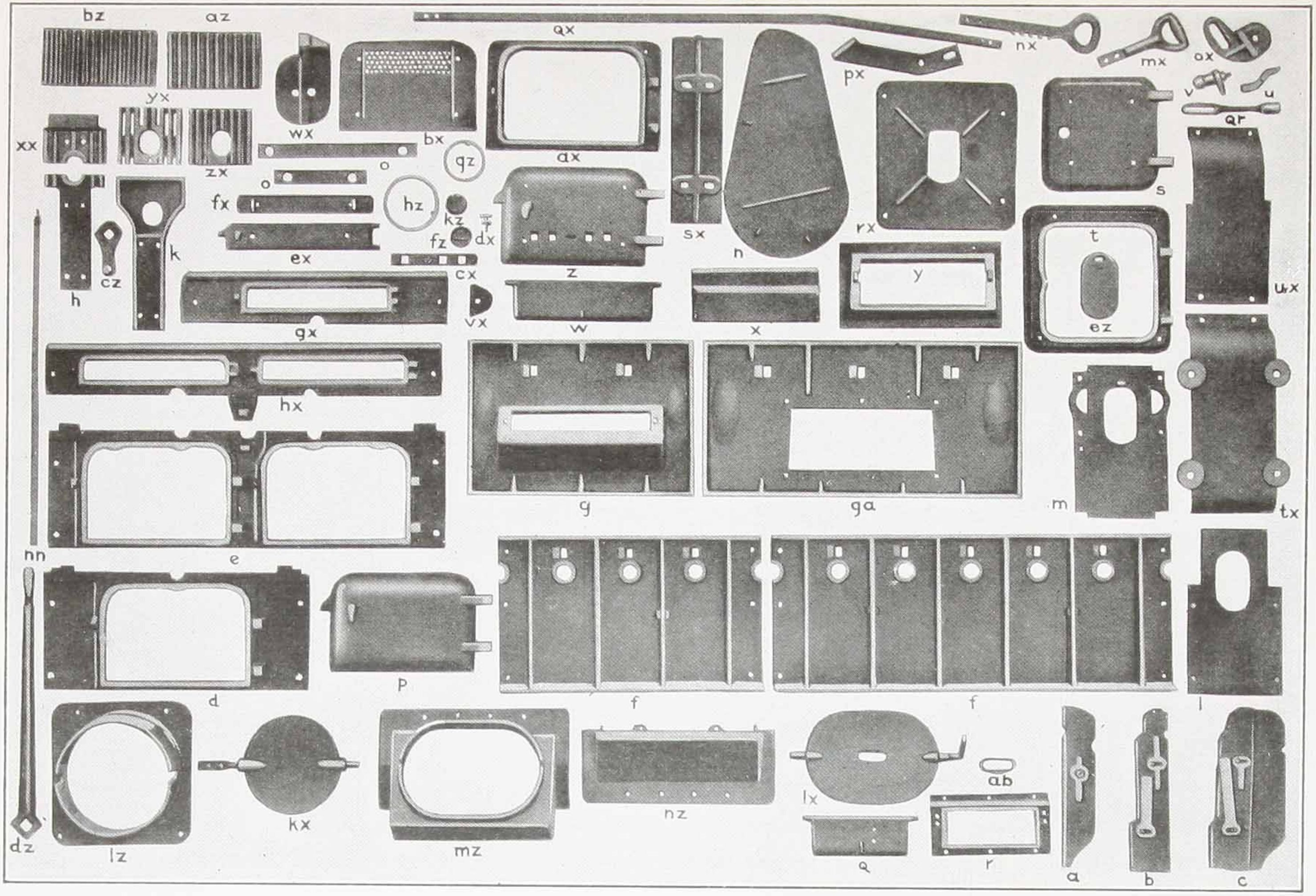
Continental Low Water Line Boilers

Price List Repair Parts

20-30-40 Series

Key Letter	Name of Part	Pattern Number	List Price
d	Base Front (forms front of base for 4 boiler sections)	4–1	$ 4.00
d	Base Front (forms front of base for 5 boiler sections)	5–1	4.75
e	Base Front (forms front of base for 6 boiler sections)	6–1	5.50
e	Base Front (forms front of base for 7 boiler sections)	7–1	7.00
f	Base Back (forms back of base for 4 boiler sections)	4–4	8.00
f	Base Back (forms back of base for 5 boiler sections)	5–4	10.75
f	Base Back (forms back of base for 6 boiler sections)	6–4	13.50
f	Base Back (forms back of base for 7 boiler sections)	7–4	15.00
g	Base End (forms end of base for 20″ boiler prior to July, 1923)	20–1	6.50
g	Base End (forms end of base for 30″ boiler prior to July, 1923)	30–1	9.00
g	Base End (forms end of base for 40″ boiler prior to July, 1923)	40–1	12.00
ga	Base End (used with balanced draft door D1)	20–A	5.00
ga	Base End (used with balanced draft door D1)	30–A	7.50
ga	Base End (used with balanced draft door D1)	40–A	110.50
h	Base Front Plate (connects 2 part base fronts and forms rest for one grate bar	84	.75
k	Base Back Plate (connects 2 part base back)	85	1.00
l	Base Front Plate, double (connects 2 bases of a double series boiler in front)	91	1.50
m	Base Back Plate, double (connects 2 bases of a double series boiler in the back)	93	1.50
n	Baffle Plate (fits over end of front flueway on smoke outlet end of boiler. Baffle Plate is not used when smoke outlet is in center of rear	20–6	1.00
n	Baffle Plate	30–6	2.00
n	Baffle Plate	40–6	3.00
nn	Brace Rod (connects front and back where 2 base parts join)		.50
nn	Brace Rod Cover		.75
o	Connecting Link, 2 hole (connects 2 grate bars)	WL–2	.50
o	Connecting Link, 3 hole (connects 3 grate bars)	WL–3	.75
o	Connecting Link, 4 hole (connects 4 grate bars)	WL–4	1.00
p	Door, Ashpit	1–1–A	2.75
	Door, Ashpit, Hinge Pin ⅜″ x 7″		.10
q	Door, Check Draft (for 20″ and 30″ boilers)	87	.75
q	Door, Check Draft (for 40″ boiler)	87–4	2.50
qr	Door, Check Draft, Balance		.50
r	Door, Check, Frame (for 20″ boiler, fits on smoke pipe)	20–5	1.00
r	Door, Check, Frame (for 30″ boiler, fits on smoke pipe)	30–5	.75
r	Door, Check, Frame (for 40″ boiler, fits on smoke pipe)	40–5	2.25
s	Door, Cleanout (for 20″ boiler)	20–4–1	1.75
s	Door, Cleanout (for 30″ and 40″ boiler)	30 & 40–4–1	2.75
	Door, Cleanout, Lining (20″ boiler)	20–4–2	.75
	Door, Cleanout, Lining (30″ and 40″ boiler)	30 & 40–4–2	1.75
t	Door, Cleanout, Frame (20″ boiler)	20–4–3	1.50
t	Door, Cleanout, Frame (30″ boiler)	30–4–3	2.50
t	Door, Cleanout, Frame (40″ boiler)	40–4–3	6.00
	Hinge Pin, each		.05
u	Door, Cleanout, Handle		
v	Door, Cleanout, Latch, Trunnion and Washer		.25
w	Door, Draft (20″ and 40″ boilers, prior to July, 1923)	20–40–2	1.00
w	Door, Draft (30″ boilers made prior to July, 1923)	30–2	1.50
	Door, Draft, Clips	19½	.05
x	Door, Draft (for 20″, 30″ and 40″ boilers after June, 1923)	D–1	1.25
y	Door, Draft Frame (for 20″, 30″ and 40″ boilers after June, 1923)	D–2	1.50
z	Door, Fire (for 20″, 30″ and 40″ boilers)	1–1–F	2.75
ax	Door, Fire, Frame (20″, 30″ and 40″ boilers)	1–2	2.00
bx	Door, Fire, Lining (20″, 30″ and 40″ boilers)	1–5	1.00
cx	Door, Fire, Slide (20″, 30″ and 40″ boilers)	1–4–1	.15
dx	Door, Fire, Slide Knob (20″, 30″ and 40″ boilers)	1–4–2	.10
	Door, Fire, Hinge Pin (⅜″ x 7″)		.10
	Door, Fire, Complete with frame		6.00
ex	Door, Slicer (all sizes of boilers)	2–1	1.00
	Door, Slicer, Hinge pin (¼″ x 2¾″)		.05

See photograph of parts, page 85.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Continental Low Water Line Boilers (Continued)

Key Letter	Name of Part	Pattern Number	List Price
fx	Door, Slicer, Lining	2–2	$ .25
gx	Door, Slicer, Frame (for 4 section base front)	4–2	3.50
gx	Door, Slicer, Frame (for 5 section base front)	5–2	4.75
hx	Door, Slicer, Frame (for 6 section base front)	6–2	5.25
hx	Door, Slicer, Frame (for 7 section base front)	7–2	6.25
kx	Damper (for 20″ boiler end smoke outlet)	20–8	.75
kx	Damper (for 30″ boiler end smoke outlet)	30–7–6	1.50
kx	Damper (for 40″ boiler and smoke outlet)	40–7–6	3.50
lx	Damper (for 30″ boiler rear smoke outlet)	30–8–R	1.50
lx	Damper (for 40″ boiler rear smoke outlet)	40–8–R	2.00
mx	Damper Handle (end flue)	17–1	.75
nx	Damper Handle (rear flue)	17–3	.75
ox	Damper Guide (end flue)	17–2	1.00
px	Damper Guide (rear flue)	17–4	1.00
qx	Damper Rod (rear flue 30″ boiler)		.90
qx	Damper Rod (rear flue 40″ boiler)		1.00
	Damper Rod (obsolete)	w101	1.25
	Damper Rod (end flue 20″ boiler)		.75
	Damper Rod (end flue 30″ boiler)		.90
	Damper Rod (end flue 40″ boiler)		1.00
rx	End Plate (takes place cleanout door double boiler)	30–4–4	1.50
rx	End Plate (takes place cleanout door double boiler)	40–4–4	2.00
sx	Front Plate (fits over water fronts where they meet)	13	1.50
tx	Front Plate (double series fits above No. 91 and bolts to the ends of the water fronts)	94	2.75
ux	Front Plate Extension (fits above Plate No. 94)	95–30	1.50
ux	Front Plate Extension (fits above Plate No. 94)	95–40	2.00
ux	Front Plate Extension (fits above Plate No. 94)	95–40	2.00
vx	Front Washer (for bolts connecting water fronts)	88	.10
wx	Front Clamp (connects 2 water fronts at top inside boilers)	89 Com.	1.25
	Flue Brush		1.50
	Flue Brush Handle		.50
	Flue Brush Handle Extension		.50
	Furnace Cement, per 100 pounds		2.00
	Galvanized Strip (for double boilers, attaches to No. 93 in rear)		2.00
xx	Grate Clamp (fits over No. 84 Base Front Plate)	86–1	1.00
yx	Grate Back (attached to No. 85 Back Plate forms grate rest)	3–1	1.25
zx	Grate Back (attached to base back forms grate rest)	3–1–2	1.75
az	Grate Side (attached to base ends)	14	1.50
bz	Grate Side (attached to base ends)	14 Com.	1.75
cz	Grate Rocking Crank (1 for each grate bar)	15	.50
dz	Grate Shaking Lever	12	2.25
ez	Hand hole cover (for Plates Nos. 91, 93, 40–4–4, 30–4–4)	92	.25
	Number Plate		.10
	Poker		1.25
fz	Push Nipple No. 3 (for water front section)		.20
gz	Push Nipple 4½″ Cast (for 20″ and 30″ boilers)		.90
hz	Push Nipple 6″ Cast (for 40″ boilers)		1.00
hz	Push Nipple 6″ Cast (for 40″ boilers)		1.00
kz	Push Plug (for water front sections)		.20
	Scraper		1.25
	Slicer Bar		1.50
lz	Smoke Hood (end flue for 20″ boiler)	20–7	2.00
lz	Smoke Hood (end flue for 30″ boiler)	30–7–1	3.50
lz	Smoke Hood (end flue for 40″ boiler)	40–7–1	7.00
mz	Smoke Hood (upper part rear flue 30″ boilers)	30–7–A	3.50
mz	Smoke Hood (upper part rear flue 40″ boilers)	40–7–A	7.00
nz	Smoke Hood (lower part rear flue 30″ boilers)	30–7–B	2.25
nz	Smoke Hood (lower part rear flue 40″ boilers)	40–7–B	8.00
	Stove Putty (1 pound can)		.25
	⅝″ x 9″ Bolts, each (draw-up bolts 20″ boiler)		.20
	¾″ x 9½″ Bolts, each (draw-up bolts 30″ and 40″ boilers)		.20
	⅝″ x 14″ Bolts, each (draw-up bolts 20″ end sections)		.30
	¾″ x 14½″ Bolts, each (draw-up bolts 30″ and 40″ end sections)		.30

See photograph of parts, page 85.

Directions for Installing Continental Low Water Line Boilers

Important

Read well *before* attempting installation.

Open all crates and boxes, taking note of the parts to be assembled.

Foundation

See that there is a good level foundation on which to set the boiler.

Mounting Base

Set up base ends (found in end box), to which bolt the base front and base back sections (found in front box) with bolts taken from box marked "Connecting Box." If base front consists of more than one piece, assemble in accordance with markings on water fronts—i. e., one water front will be stenciled "Right" and the other "Left." "Right" being for right side as you face the boiler. In assembling base, place the base front and base back to the right which correspond in length to the water front stenciled "Right". Place the base parts to the left which correspond in length to the water front stenciled "Left." If a No. 8 water front is used, two No. 4-1 base fronts and two No. 4-4 base backs are used to form eight-section base part. *The ends of the two water fronts must meet on a line with the point where the base parts join.*

The following table shows the base front and base back which must be used to form base part to correspond with the water front section:

Water Front	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Base Front No.	4–1	5–1	6–1	7–1	4–1	4–1
					4–1	5–1
Base Back No.	4–4	5–4	6–4	7–4	4–4	4–4
					4–4	5–4

The connecting pieces for the various parts will be found in the "Connecting Box." The packing slip states where each part goes.

Place the piece of $\frac{3}{8}$" pipe shipped attached to the firing tools, between the front and back of the base at the place where the two part base fronts and backs join. Run the long rod through it, using one of the holes in the base front and one in the base back. The long rod will take the place of one of the short bolts in the front and one in the back. Tighten the nuts on the long rod so that the pipe which acts as a covering for the rod will be snug against the front and back of the base, thus bracing it.

After the base is bolted together and placed in position, *be sure it is absolutely level.* Cement all around the inside of the base at bottom to prevent air coming into the ash pit, except through the draft doors.

Place the grate bars in position with longest shanks extending through the base back. The shanks extending through the base back must all be the same length. Plain grate bars have a very short shank on one end which rests on

the base front. Shaking grates have longer shanks which extend through the base front. The shank which goes through the front *does not have a slot in it.*

Be careful not to reverse the shaking grates. Put rocking cranks on rear end and secure them with cotter keys sent for that purpose, bending down the ends of the cotters so they will not work out of place. Place the grate connecting links on the rocking cranks and secure them with cotter keys. Place boards on grates to hold them flat while erecting boiler sections.

Mounting Sections

Place the right end section, stenciled "1," on the right end of the base as you face it. Wipe nipple and nipple holes *clean, and oil thoroughly.* Place nipples in ports, tapping lightly into place with a mallet. Set up intermediate section, stenciled "2," next to right end section and bolt up with ¾" x 14½" bolts, drawing up fairly snug. (See paragraph headed "Baffle Plate.") Then cement around rear flue and front side of front flue so gases cannot short circuit between the sections. Try to keep sections as nearly parallel and perpendicular as possible, that is, do not have sections entirely together in front and ½" apart in the rear. An approximate even distance all around is better. Proceed as before with nipples and set up section stenciled "3." If boiler is smokeless, read separate direction card, covering "Smokeless Type," before proceeding further.

Bolt up with ¾" x 9½" bolts, placing threaded end to the left. This allows a free space at top of the section and will not interfere when tightening up. It may be necessary to bend the bolts slightly to get them through the holes. *Do not draw up sections as closely as they will go.* The boilers are assembled on an approximate 7"-center. However, one quarter inch more or less than this will be taken care of in the final drawing up. Continue setting up the other sections as indicated by the stenciled figures until all the boiler sections are in place.

Boiler assembles easier by starting from right end, but start can be made from left end if boiler room space makes it more convenient.

If boiler sections are not stenciled, ignore reference to stenciled markings. All intermediate sections including tapped and cutout sections are identical so far as fire-travel and interior design and can be assembled in any position. Intermediate tapped sections have a top-flow tapping. Intermediate cutout sections are cut out in rear to form rear smoke outlet and can be assembled so smoke outlet is on either end in rear, or in center of rear. Boilers having ten or less sections do not have cutout sections; the smoke outlet is taken from end (not rear), and can be placed on either end of boiler. Cleanout door goes on opposite end.

To attach the water front section to a boiler requiring only one water front section, place the small nipples in the nipple holes of one end boiler section; bring up water front and drive it on with block of wood and hammer. Place ½"-bolts in position at the push nipple end and draw up water front, keeping it at right angles to the end section. (Water fronts are connected to boiler with two nipples *on one end only.* Blind nipples or plugs are used in opposite end of front section and in end boiler section not connected to front.) Use the long bolt at top of water front section. Cast-iron washers are supplied for the heads of the bolts. If the smoke outlet is taken from end of boiler plate, No.

17-2 takes place of washer on upper bolt and acts as damper handle guide. If smoke outlet is taken from rear of boiler, attach Damper Guide No. 17-4 to front top lug of intermediate boiler section on a line with rear damper shank.

In case the boiler has more than one water front, attach each water front section, but do not attach connecting Plates No. 13 and No. 89 Com., until the slicer door frames have been placed in position. If water fronts overlap, loosen front draw-up bolts on top of boiler and wedge sections apart with block of wood.

If the water fronts do not set parallel with the top of the base, that is, if one end of the water front is too high, tighten top bolts in rear of sectional part of boiler, opposite water front, and loosen bottom bolts slightly. If one end of the water front is too low, tighten the lower bolts in the rear of the sectional part of the boiler opposite the water front, and slightly loosen top bolts in rear.

Because the water front is attached with nipples to one end boiler section only, the position of the end boiler section will affect the position of the water front section, and slightly shifting it will bring the water front section into proper position.

After the water front or fronts are in proper position, attach the slicer door frames which fit in the space between the water front and the base front. *End sections must set back on base ends about an inch, so bottom of water front is over base ends.* Also attach grate clamp No. 86-1 which fits over the base front plate No. 84; the latter plate connects the two-part base fronts. Also attach front plate No. 13 and front clamp No. 89 Com., which fits inside the boiler where the two water fronts meet at the top. The lug on the end of front clamp fits back of the intermediate section, thus holding water fronts from springing out. The front clamp is held in place by bolts which go through Plate No. 13.

After the boiler is completely assembled, go over the entire boiler, taking up a little on each nut, skipping about so that an even tightening takes place. After the final tightening up, the boiler may be slightly longer than the base, one half to three quarters of an inch is permissible. Shove the boiler to a square position on the base by means of a bar or jack. A jack will be found very useful in setting up boiler.

Unless the sections are drawn up evenly and in a perpendicular position, there may be nipple leaks. By tightening or loosening up the bolts of the sections where the nipple leaks occur, the section can be drawn into proper position which will stop the leak.

Baffle Plate

The baffle plate (No. 20-6 for 20″ boiler), (30-6 for 30″ boiler), (40-6 for 40″ boiler) must be placed between the end section and the intermediate section next to the end on *the same end of the boiler from which the smoke outlet is taken,* in such a manner that the front flue will be shut off from the end of the boiler and cause the gases to travel to the other end of the boiler before entering the back flue. The baffle plate can be installed after the boiler is completely assembled, but is easier to install it as the boiler is being assembled.

If the baffle plate goes in left end of the boiler as you face it, the side of plate with the pattern number on it goes inside towards the boiler. If baffle plate goes in right end of boiler, the side with the pattern number on it faces out. (This applies to Plates No. 30-6 and No. 40-6.)

Baffle Plate No. 20-6 (for 20-series boiler) should be placed in end with lug at bottom facing inside and resting on the intermediate section. Be sure to

cement all around the baffle plate so there will be an absolutely tight joint, thus preventing the gases from coming through. Do not use baffle plate if the smoke outlet is taken from the center of rear of boiler.

Single boilers with rear smoke outlet have cleanout door for one end which should be placed on most convenient end for cleaning boiler. End plate with plate cover No. 92 goes on opposite end of boiler. If holes in plate do not line up with holes in boiler, reverse the plate. End plates are supplied for double boilers and should be attached to the right end boiler section of the left-hand boiler and the left end section of the right-hand boiler; i. e., attach end plates to the intermediate end sections.

Plate Castings

Before bolting the plate castings (such as door frames and smoke hood) to the sections, put a little stove putty (in small can) on the plates where they come against the sections so it will make a good joint.

Damper Regulator

If a damper regulator is to be used, connect it to the draft door on the smokepipe end of the boiler, and to the check draft that is sent to be placed in the smokepipe.

Flue Connection

Be sure the chimney flue is clear and that there are no other openings than the one intended for the boiler. If it is impossible to look through the flue, it will often save dissatisfaction and annoyance afterwards if you will go on the roof and let a weight, on the end of a rope, down the flue. After the flue is found to be clear, place the damper in the flue connection and place the smoke-pipe in position; drive nails through smokepipe to hold it on. Holes will be found in collar to receive the nails. The check draft should be placed on the horizontal smokepipe a little above the center of the side, so the door, when closed, will be about a 45° angle.

Important

It is very important that all openings between sections and between base and sections are thoroughly cemented so the draft may be properly regulated. If openings are left between the sections so air can draw between them it will seriously check the draft and prevent the boiler working in a proper manner. If there is an opening left between the base and sections it will be impossible to properly regulate the fire or to check it when desired.

Oil and Grease Cause Trouble

Oil on the water of a steam boiler forms a blanket and keeps the steam or vapor from breaking through, thereby causing surging and foaming. There is an unavoidable accumulation of oil and grease from the pipe and fittings in a newly-installed steam or vapor system. It is best removed by blowing off the boiler under pressure. This should be done by the heating contractor about one week after the installation is completed, and repeated at intervals until clear water shows in the gauge glass.

Blowing Off a Steam Boiler

Close all radiators valves, or if the mains are valved, close both flow and return valves tightly. Remove damper regulator and safety valve and plug the openings.

Remove the 1¼″ plug from the skim gate opening on the right end section of the boiler near the water line. Connect a blow-off pipe, extending it to a drain or out of the boiler room window so the steam will not fill the boiler room while the boiler is being blown off. The blow-off pipe must be provided with a full-sized cock.

With sufficient fire to keep the water boiling, open the cold water supply enough to cause the water in the boiler to overflow slowly through the blow-off pipe. It will be necessary at intervals to shut off the cold water supply and the valve in the blow-off pipe to raise the water to the boiling point. Continue this process until all the oil and grease is skimmed off the surface of the water.

Allow fire to die down and have water in the boiler at the normal water level. Close the blow-off cock and raise fifteen pounds steam pressure with a *wood fire;* open cock in blow-off pipe, which will cause the water and steam to be blown out, carrying with it the oil and grease. Supply sufficient cold water while blowing off to maintain water level with the blow-off opening. Maintain the steam pressure at fifteen pounds and continue the blowing off for two hours. Then draw down water to proper level.

Remove the blow-off pipe and replace the regulator and safety valve.

Open the valves on the flow and return mains and the radiator valves.

Boiler may be blown off through the safety valve opening in which case a higher water level must be maintained.

If an unusual amount of oil and grease is present, add a small quantity of soda ash which should be boiled in the boiler for thirty minutes before the boiler is blown off. Five pounds is sufficient for small boilers and up to thirty pounds for the larger sizes.

(Thoroughly blowing off the boiler will eliminate much trouble, especially on a vapor job.)

If water supply pressure is not available, the surface blow-off cannot be a continuous operation. Bottom blow-off as described below should then be repeated several times.

Bottom Blow-Off

Some fitters in order that the cleansing may be thorough, proceed as follows: After the boiler has been blown off for two hours, close the cock in the blow-off pipe, shut off cold water supply and open drain cock at the bottom of the boiler, being careful that sufficient fire is carried to maintain pressure until all the water is blown out through the drain cock. The remaining fire is then drawn *immediately* and the boiler allowed to cool. *After the boiler is cold,* water is added to the proper level. Remove the blow-off pipe and replace the regulator and safety valve. Open the valves on flow and return mains and the radiator valves.

Directions for Erecting Smokeless Boilers

Follow directions for setting up the regular type of boiler excepting before the intermediate sections are mounted see that the two grooves on the right-hand side of the intermediate sections near the top, as you stand facing them,

are filled with cement so that when the sections come together the space between the cement-filled grooves will form an air-tight duct from the top of the boiler down to the top of pre-heated air retort.

After the sections are in place, put a small amount of asbestos cement on the top and rear sides of the retorts, then place them in between the sections on the lugs which hold them in place, pushing them back against the vertical ribs on the sides of the sections so they form a wall across the boiler, causing all fire to pass under them. After jet is in place, adjust the clamps so they rest securely on the water tubes, and then tighten the screws. Put more asbestos cement in front of jets at the top, so all air coming in through the duct must pass through the retort. The jet for the right end of the boiler has an adjustable plate. Loosen the screws holding this plate, place jet into position and slide the plate as far to right as possible, so it fits tightly against end-boiler section, back of the rib cast on the end section, then tighten screws. A small baffle plates goes between the left end section and the next section, instead of a retort, on 40-series boiler.

The oval-shaped air cups fit over the openings on top of boiler through which secondary air is supplied. Do not cement up the openings and be sure to place air cups in position before covering the boiler with asbestos. *Cement around the air cups.*

Directions for Erecting Double-Series Boilers

The double-series boiler is two single boilers connected together by plate work. There is no water or steam connection excepting that made with piping by the steam fitter.

Mount the base as per our regular instructions for single boilers, setting them on the foundation seven inches apart, connecting them with the plates marked No. 91 at the front and No. 93 at the rear of the base. See that the bases are perfectly level and in line with each other.

Mounting Sections

Erect sections of the right-hand boiler first and in accordance with directions for single boilers. Then set up the left-hand boiler in similar manner.

Attach the water fronts to both boilers and bolt Plate No. 94 into place so it covers the space between the two boilers. Only one end of each water front is connected to boiler. Plate No. 94 fits above Plate No. 91, which joins the two bases, and should be bolted to the ends of the water fronts. If the two boilers are out of line the plate will not fit properly. Shove the boilers into alignment on the bases by means of a bar or jack. A jack is best. Then attach Plate No. 95-30 or 95-40 above Plate No. 94. The space between the two boilers at the top and in the rear is covered by a strip of iron which bolts to Plate No. 95-30 or 95-40 in front and to Plate No. 93 in the rear.

The flue connections are taken from the rear of the boiler covering the intermediate cutout sections. In boilers having fifteen sections or less in each side, the cutout sections should be placed so the two flue connections will be close together, and baffle plates must be used in the smoke outlet end of boilers. In larger boilers, place the cutout sections near the center of each half of the boiler and do not use the baffle plates.

General Code

At what price and how soon can you ship? ..... saber
Shipment within ..... after receipt of order ..... sable
Answering your inquiry we could promise ..... sabot
Add to our order ..... sacrum
Can ship immediately ..... saffron
Change our order (No. or date) to read ..... sagas
Can you ship immediately? ..... sahib
Can you ship immediately? If not how soon can you promise? ..... saiga
Cannot ship immediately, but can ship ..... saint
Cannot ship immediately. May we substitute? ..... saki
Do not hold for other orders. Ship quickly ..... salium
Enter order as per our inquiry ..... salina
Enter order at your quotation of ..... sallet
Expect to make shipment ..... salmi
Factory shipment with regular freight allowance ..... salon
Have received no reply to our letter of ..... salpinx
Have received no reply to our telegram of ..... saltire
Have written ..... salver
In market for ..... sambo
Mail as promptly as possible ..... samp
Must have information immediately ..... sanction
Must have immediate shipment Order No. ..... sandal
See our letter giving full particulars ..... sanders
Ship immediately by best route ..... sandix
Ship immediately by express ..... sanguify
Ship immediately our order (No. or date) ..... sapid
Quote best price ..... sappan
Referring to our letter of ..... sarcine
Referring to our telegram of ..... sarcode
See our letter of ..... giving particulars ..... sardonic
We are mailing today ..... sasin
We quote for immediate acceptance ..... satan
Will be here until ..... satiate
Will be in ..... satrap
Will wire ..... saturn
Will write full particulars today ..... saul
Will send shipping instructions by mail ..... savage
When and by what route did you ship your order? ..... savant
When can you make shipment? ..... savor
When will order (No. or date) be shipped? ..... sawyer
Wire at once, carload rate of freight ..... scade
Wire at once, less carload rate of freight ..... scale
Wire reply quickly ..... scamp
Wire us car number and initial ..... scant
Your order (No. or date) was shipped ..... scarab

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